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Report of the
**CHIEF OF TRANSPORTATION
ARMY SERVICE FORCES
WORLD WAR II**



WAR DEPARTMENT
WASHINGTON, D. C.
30 NOVEMBER 1945

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Report of the
CHIEF OF TRANSPORTATION
U.S. ARMY SERVICE FORCES
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DISTRIBUTION:

AAF (200); AGF (200); ASF (200); USMA (100); Special distributio
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**ARMY SERVICE FORCES
OFFICE OF THE CHIEF OF TRANSPORTATION
WASHINGTON 25, D. C.**

30 November 1945

To The Commanding General
Army Service Forces

Incident to my retirement from the office of Chief of Transportation, as of this date, I am submitting a report covering the work of the Transportation Corps during the period of my incumbency.

It is hoped that the information presented, and particularly the conclusions which are briefly stated in the last section of the report, will be of aid in formulating plans for Army transportation during the post-war period and in meeting the requirements of any future emergency.

C. P. Cross
C. P. CROSS
Major General
Chief of Transportation

In global warfare
considerations of strategy and
transportation are inseparable

SECTION I



THE MAGNITUDE OF THE TASK

The burden imposed upon transportation in World War II far exceeded that in any previous war. The truth of this statement is so obvious that no supporting arguments are necessary. Yet as a background for this somewhat detailed report on the work of the Army Transportation Corps, a brief review of the more important circumstances which contributed to making the transportation task both large and complicated will be useful.

First, there was the size of the military establishment. It was unprecedented in the nation's history. From November 1940 to the conclusion of hostilities in August 1945, the Army inducted more than 10,000,000 men and women, as compared with 3,832,000 during World War I. In the zone of interior, this personnel had to be transported to induction stations, re-

ception centers and training centers. After completion of basic training, a large portion of the troops was given specialized training and put through field maneuvers, all of which involved further travel. By the time the soldier had reached a port of embarkation ready for service overseas, he had made at least five Army-planned trips by railway or highway, and in most cases more. In addition, he probably had made several furlough trips at his own expense.

More than 7,290,000 passengers were moved by the Army from United States ports to oversea destinations between December 1941 and August 1945, as compared with about 2,059,000 in 1917-18. American soldiers were stationed on every continent and on a multitude of large and small islands. Some



of them were transported relatively short distances to our nearby bases, but more than 4,000,000 were sent to North Africa and Europe over routes averaging about 3,500 nautical miles, more than 2,000,000 were moved to the Pacific where the shipping lanes ranged up to 6,300 miles, and substantial numbers were transported much greater distances to India and Iran.

In addition to the long routes over which troops and their supporting supplies had to be moved before contact with the enemy could be made, there was the perpetual problem of oversea discharge ports. During the war, vessels under Army control delivered men and freight at 330 different ports and beaches throughout the world. Many of the ports were small and their facilities wholly inadequate. Others had been badly

damaged before our forces gained control of them. Often the operations at ports and beachheads were carried on under enemy artillery fire and aerial attack. Frequently the available native labor was insufficient in quantity and inefficient in quality. The swiftly developing tactical situation sometimes rendered it inadvisable for ships to discharge at the ports for which they had been loaded. These working conditions, added to the great distances which had to be covered, meant long turn-arounds for the vessels and limited the amount of traffic which they could handle in a given period.

The maintenance of so large a fighting force involved a tremendous amount of construction work. In the zone of interior there were cantonments, depots, fortifications, airfields, and

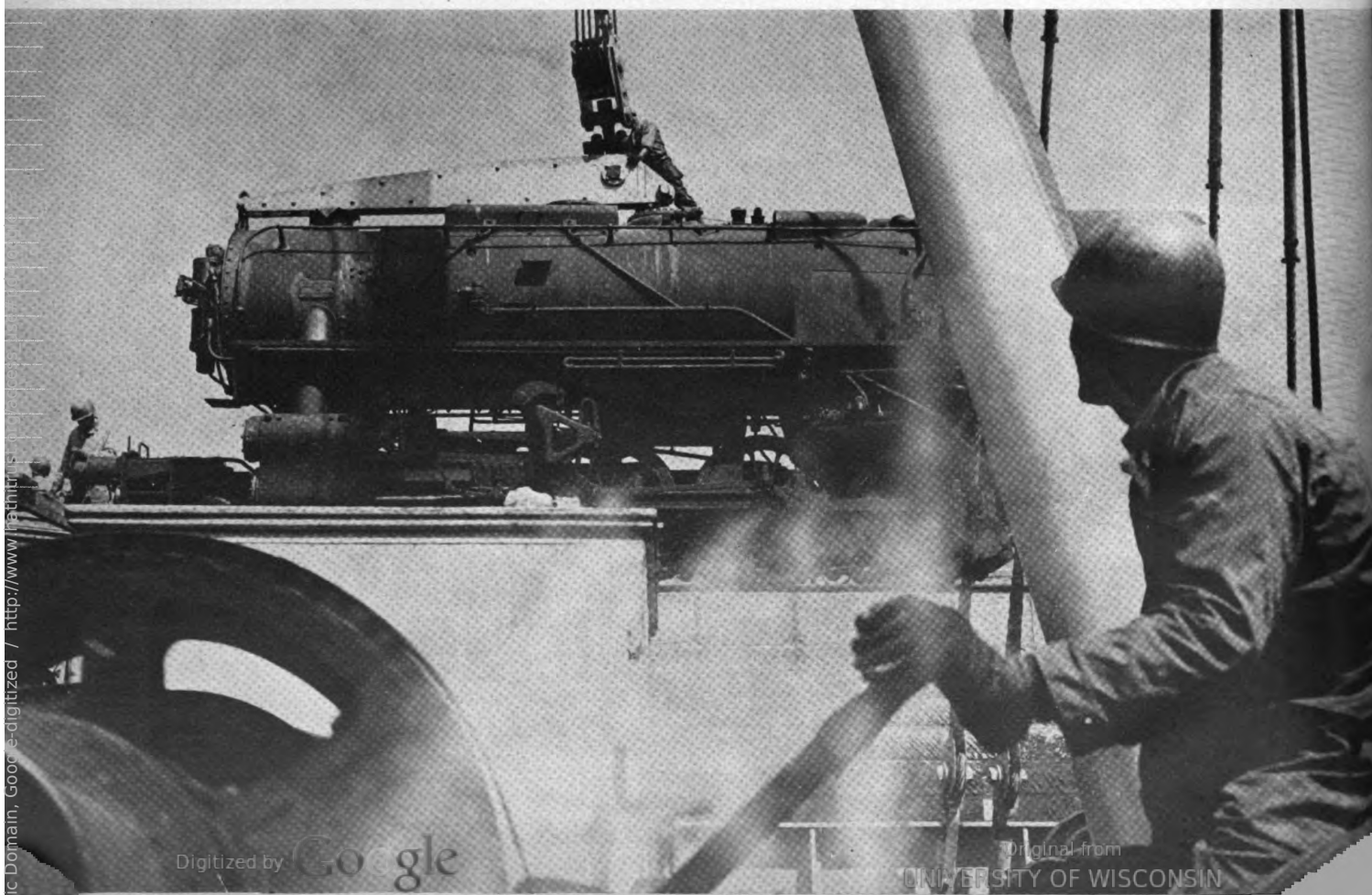
many other types of military installations to be built. The same was true overseas, and in addition the Army constructed or reconstructed many ports, railways and highways to facilitate the movement of our forces and their supplies into and through foreign countries. The transportation of the necessary materials and building equipment was in itself a sizable task. This was especially true as regards oversea construction, and it is worth noting that while in some areas it was possible to obtain building materials locally, in many instances most or all of those materials had to be supplied from the United States.

Whether at home or abroad, whether training or fighting, whether in the mountains or the desert, the Arctic or the tropics, our forces had to be supported with a constant stream of military equipment and supplies suitable to the operation in which they were engaged. The American soldier was provided with the best fighting tools, the best food and clothing, the best living conditions and the best medical care that our scientific and industrial genius could provide and the circumstances of his employment would allow. Morale was considered as important as physical condition, and so books and magazines, athletic and recreational equipment, ice cream, soft drinks, and many other things to which the American youth is accustomed at home, were provided at training camps and oversea stations—even though they added considerably to the tightness of an already tight transportation situation.

The strategy of the war, involving as it did so many amphibious assaults upon enemy-held territory, had large transportation implications. In only a few instances were these assaults launched from American ports. Generally they were mounted at oversea bases where our troops, military supplies, and construction materials had been assembled in advance. This involved the employment of large numbers of ships within the theaters, and necessitated repeated loadings and unloadings. It necessitated the construction of port facilities, depots, airfields, etc., at many rear bases which later were abandoned for more advanced bases. It meant that more men and supplies had to be kept in the "pipeline" between our own shores and the combat areas, involving a proportionately greater amount of transportation.

This global conflict saw many significant developments in the art of warfare. Prominent among them were the more complete mechanization of ground forces and the great advance in air power. Each of these had direct transportation implications. The machines themselves—the motor vehicles, armored tanks, and airplanes—were bulky and required a great amount of space when shipped by railway, highway or water. They consumed fabulous quantities of gasoline and oil, a large part of which moved from point of origin to point of consumption in tank cars, tank trucks, and tank vessels. The intricate mechanisms required constant maintenance, so that repair

Transportation Corps troops unloading an American-built locomotive at Cherburg.





Troops of a task force move forward "on wheels" at a base in the Pacific.



Soldiers of the Fifth Army cross the Brenta River in northern Italy in an amphibian truck.

shops and replacement parts had to be shipped wherever they might be needed. Animals and forage were considered space-consuming freight, but they did not approach the requirements of the motor-propelled machines which characterized the recent conflict as the first great mechanized war.

The increased mechanization of the land forces and the widespread employment of air power added greatly to the tempo of the fighting, and this greater tempo, together with the greater power of explosives, stepped up the destructiveness of warfare to a marked degree. Another result was the greater attrition suffered by weapons and other equipment kept constantly in action. This greater destruction and greater attrition meant that greater quantities of replacements had to be shipped to the forces. The tonnage differed with different theaters and at different times, but on the average about six measurement tons of equipment and supplies accompanied each soldier sent overseas, and one ton per man was shipped each month thereafter.

In addition to destroying all facilities which might be of use to the invading American forces, the retiring foe consumed or took with him as much subsistence, fuel, and other supplies as he could seize, and the United States Army found it both humanitarian and politically expedient to provide the necessities of life for the impoverished civil population—another charge upon transportation.

At times during the period of hostilities, the Army utilized as much as 50 percent of the sleeping cars and 30 percent of the coaches in service on the American railroads, shipped as high as

12.5 percent of the freight carried by the railroads, and had in its service more than 48 percent of the ocean-going shipping, other than tankers, under American control.

The heavy transportation requirements of the Army by land and sea, naturally constituted only part of the load placed upon the carriers. The shipping program of the Navy also was large. The huge quantities of equipment and foodstuffs which were sent to our Allies under the Lend-Lease Act competed for car and ship space with the supplies which we were transporting to our own forces. Whereas in 1917-18 the American Expeditionary Forces obtained about half of their supplies and equipment from European sources, in World War II the United States assumed the role of the Arsenal of Democracy. The home civilian economy, though curtailed in some respects, suffered no serious encroachments and continued to make heavy demands upon the carriers.

The difficulties which the American transportation industries encountered as a result of the war were great, and the manner of their overcoming was truly remarkable. Something of that story must be told in order that the problems and accomplishments of the Army Transportation Corps may be clearly visualized and fully understood. It breaks down into two phases—that of domestic transportation and that of ocean shipping. Success in both fields was necessary to the winning of the war. Both experienced their periods of crisis. The most critical stage in ocean shipping came in the early months of American participation; that in domestic transportation came toward the close of the war.

The Shipping Situation

Since all active theaters of operation were overseas, the United States Army was wholly dependent upon ocean transport in making its strength effective against the enemy. The only way the cause of the democracies could be vindicated was to attack and defeat the foe on his own soil. The Axis powers were as well aware of that fact as we were, and they did all they could to capitalize upon it. Germany particularly, from the early days of Hitler's regime, stressed the construction of submarines. The undersea raider had almost accomplished its purpose in the last war; now there were improved types of U-boats available, air power was an added menace to shipping, and the Allies again were unprepared.

When Europe went to war in September 1939, the world's ocean-going merchant shipping totaled approximately 80,000,000 deadweight tons. Britain and France controlled 27,000,000 tons and a good portion of neutral shipping was available to the Allies. Yet, because Britain and France were cut off from the rest of Europe, were heavily dependent upon

imports and had failed to stockpile essential commodities, their requirements of overseas shipping were at once large and vital. The German blockade became effective immediately, and during the 27 months prior to the entry of the United States into the war about 16,000,000 deadweight tons were sunk by the Axis. During the same period the combined output of the shipyards of the United Kingdom and the United States, which were almost the sole source of new merchant shipping for the Allies, was only 5,000,000 deadweight tons.

On 1 December 1941, the ocean-going passenger, dry cargo, and tank vessels under the flag of the United States aggregated about 11,600,000 deadweight tons. A few American merchant ships, engaged in services which the Germans considered unneutral, had been sunk by submarines, but up to that time our losses had been negligible. From the date of our open belligerency, however, they began to mount. Concentrations of German submarines appeared in the Western Atlantic, the Gulf of Mexico and the Caribbean, and unescorted vessels moving coastwise were sunk within sight of our shores. American ships totaling about 3,609,000 deadweight tons were lost during

In order to meet the requirements of the overseas theaters, ships were worked "round the clock" at American ports.

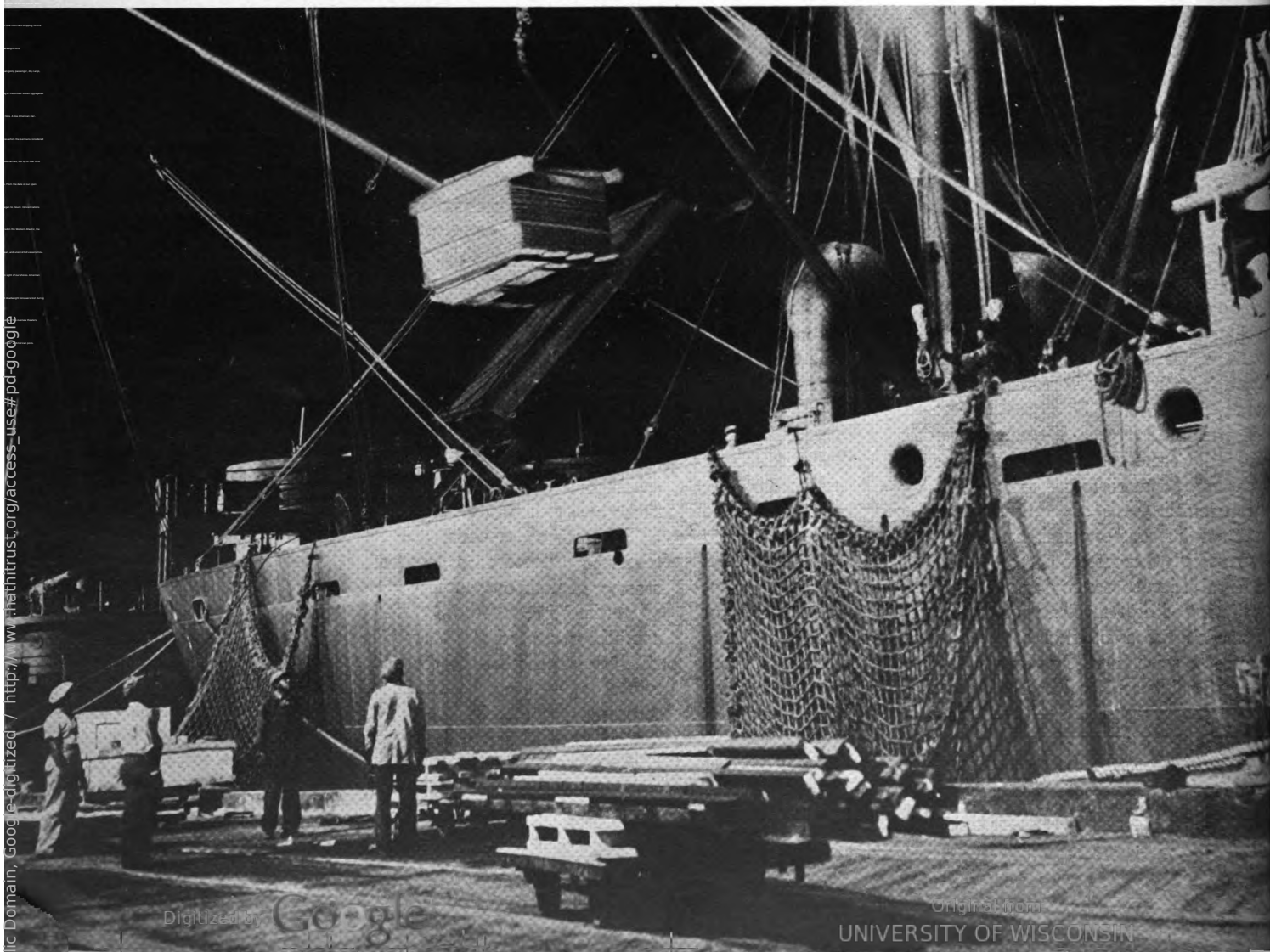
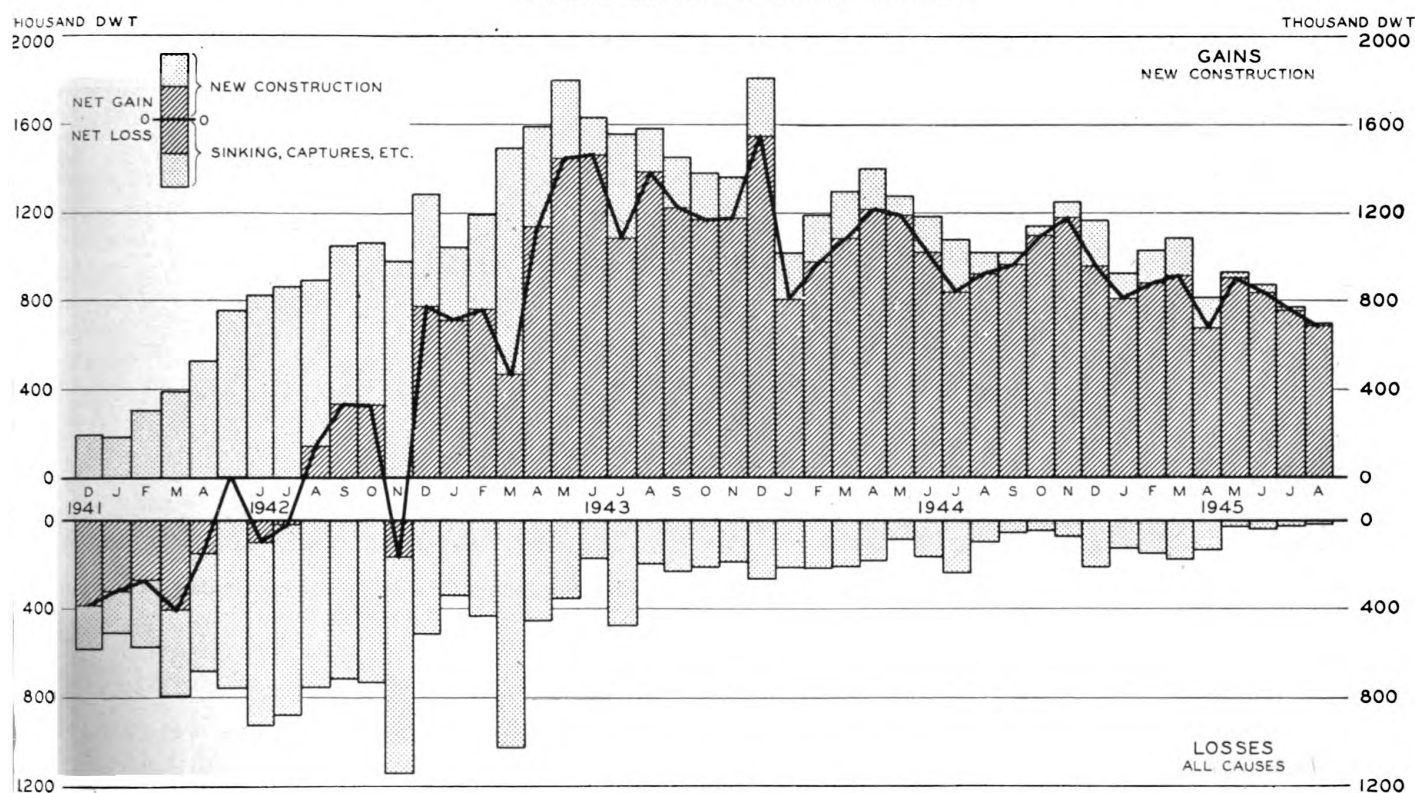


CHART NO. 1

MONTHLY LOSSES AND COMPLETIONS, OCEAN-GOING MERCHANT VESSELS OF THE UNITED NATIONS
AND NEUTRALS, EXCLUDING TANKERS

SOURCE: WAR SHIPPING ADMINISTRATION SHIPPING SUMMARY

1942, the year of heaviest casualties, and approximately 6,764,000 deadweight tons went to the bottom during the course of the war.

For the entire war period, the losses of vessels controlled by or available to the United Nations aggregated over 36,000,000 deadweight tons. Allied shipping losses during World War I were about 18,000,000 DWT. The total for World War II breaks down as follows:

	Nontanker DWT	Tanker DWT	Total DWT
Sept. 1939-Dec. '41.	13,700,000	2,600,000	16,300,000
Year 1942.....	8,957,000	3,070,000	12,027,000
Year 1943.....	4,342,000	977,000	5,319,000
Year 1944.....	1,804,000	293,000	2,097,000
Jan.-Aug. 1945...	679,000	160,000	839,000
Total.....	29,482,000	7,100,000	36,582,000

The greater part of the sinkings resulted from submarine activities, but the losses from other causes were substantial. Thus, 72 percent of the United Nations' tonnage loss during the period 1942-44 was attributable to U-boats, 9 percent to aircraft, 9 percent to surface raiders, 5 percent to other enemy action,

and 11 percent to marine casualties. Losses from marine casualties were relatively high because of the unusual hazards of operating in convoys at sea and in congested harbors, and the necessity of navigating without lights.

During 1940 and the early part of 1941 there were several months when the Allied shipping losses exceeded the combined shipping output of the United Kingdom and the United States by more than 500,000 deadweight tons. The winning of the war required not only that losses be offset by new construction, but that they be exceeded by a substantial margin in order that sufficient shipping eventually might be available to the United Nations to enable them to launch the heavy offensives which were necessary to the defeat of the Axis. There were two means to this end—reduction of the losses by improved defensive and offensive measures, and a colossal ship construction program. Both means were pursued with utmost vigor.

The exceedingly heavy losses during 1942, as during the preceding years, were the result of the inadequate protection afforded merchant shipping. Immediately following Pearl Harbor and the extension of hostilities to the Pacific, the United Nations had a wholly inadequate number of escort vessels for



Gasoline was among the first supplies landed in support of an invading force.

the convoys that sailed, and many vessels sailed independently which should have been escorted. Aerial coverage by either shore based or carrier based planes was practically nonexistent. However, the tremendous program of new escort vessels and aircraft carriers executed by the Navy, and the establishment of offshore aerial patrols, together with the improvement of defensive devices and weapons, gradually placed the submarine in check. By the summer of 1943, although the losses still were heavy, confidence was felt that the danger point had been passed. By early 1944 the number of submarines being destroyed was greater than the number of Allied merchant vessels being lost through submarine activity.

Considering the low ebb of American shipbuilding during the early thirties, and the vital part which the American shipbuilding industry was called upon to play in the successful prosecution of the war, it was fortunate that this industry was well on the way toward rehabilitation when we entered the conflict. Broadly speaking, this rehabilitation began with the passage of the Merchant Marine Act of 1936, which set up a definite national maritime policy, established the Maritime Commission as an effective agency for the promotion of that policy, and opened the way to the inauguration of a long-range shipbuilding program aimed at modernizing and balancing our merchant fleet.

From the early days of the fighting in Europe, it was foreseen that the tonnage losses suffered by the Allies could not be replaced by ships built in European yards. After the German forces had overrun Norway, the Low Countries, and France in the early summer of 1940, this fact was even more apparent

and its implications became more serious. Accordingly, in the fall of 1940 the British placed orders with American shipyards for 60 freighters. Early in 1941 the Maritime Commission ordered 200 more cargo carriers. By the end of 1941 the American shipbuilding program, including foreign and American orders, had been expanded to include about 1,200 vessels aggregating about 14,000,000 deadweight tons, to be delivered by the end of 1943. It was with a view to expediting the deliveries of the British orders that a ship of simplified design, utilizing the reciprocating engine, which was the type most readily available, was agreed upon. This ship—the LIBERTY—became the backbone of the entire wartime shipbuilding program because of the speed which it could be constructed.

Our entry into the war, and the necessity of transporting troops and supplies to all corners of the globe, eventually resulted in an unprecedented program of merchant ship construction by American yards. During the 5-year period 1941-45, a total of 5,280 ocean-going vessels, aggregating over 54,000,000 deadweight tons, was delivered. This total figure for American merchant ship deliveries breaks down into annual figures as follows:

Year	No. of ships	Deadweight tons
1941.....	105	1,165,200
1942.....	740	7,918,000
1943.....	1,719	18,561,400
1944.....	1,623	15,982,200
1945.....	1,093	10,597,300
Total.....	5,280	54,224,100

Any attempt to break down American ship construction during World War II into types is likely to be misleading, since the basic types were subject to many modifications to meet the varied requirements of the war. Many LIBERTY ships were converted to serve as troop transports, as hospital ships, and as

	No. of ships	Deadweight tons
Standard cargo.....	475	4,694,400
Liberty ships.....	2,708	29,182,400
Victory ships.....	414	4,491,700
Tankers.....	678	10,934,200
Military troop ships.....	245	1,243,700
Other military types.....	266	1,791,700
Miscellaneous.....	494	1,886,000
Total.....	5,280	54,224,100



Beginning the war with an ocean-going merchant fleet of 11,600,000 deadweight tons, the United States had at the close of hostilities a colossal fleet aggregating about 54,000,000 deadweight tons. By the end of the war, merchant shipping under the control of the United Nations had grown to an aggregate of about 90,000,000 deadweight tons. Yet at no time was there a surplus. Rather, there was a constant demand for more. Shipping was the key to the war effort.

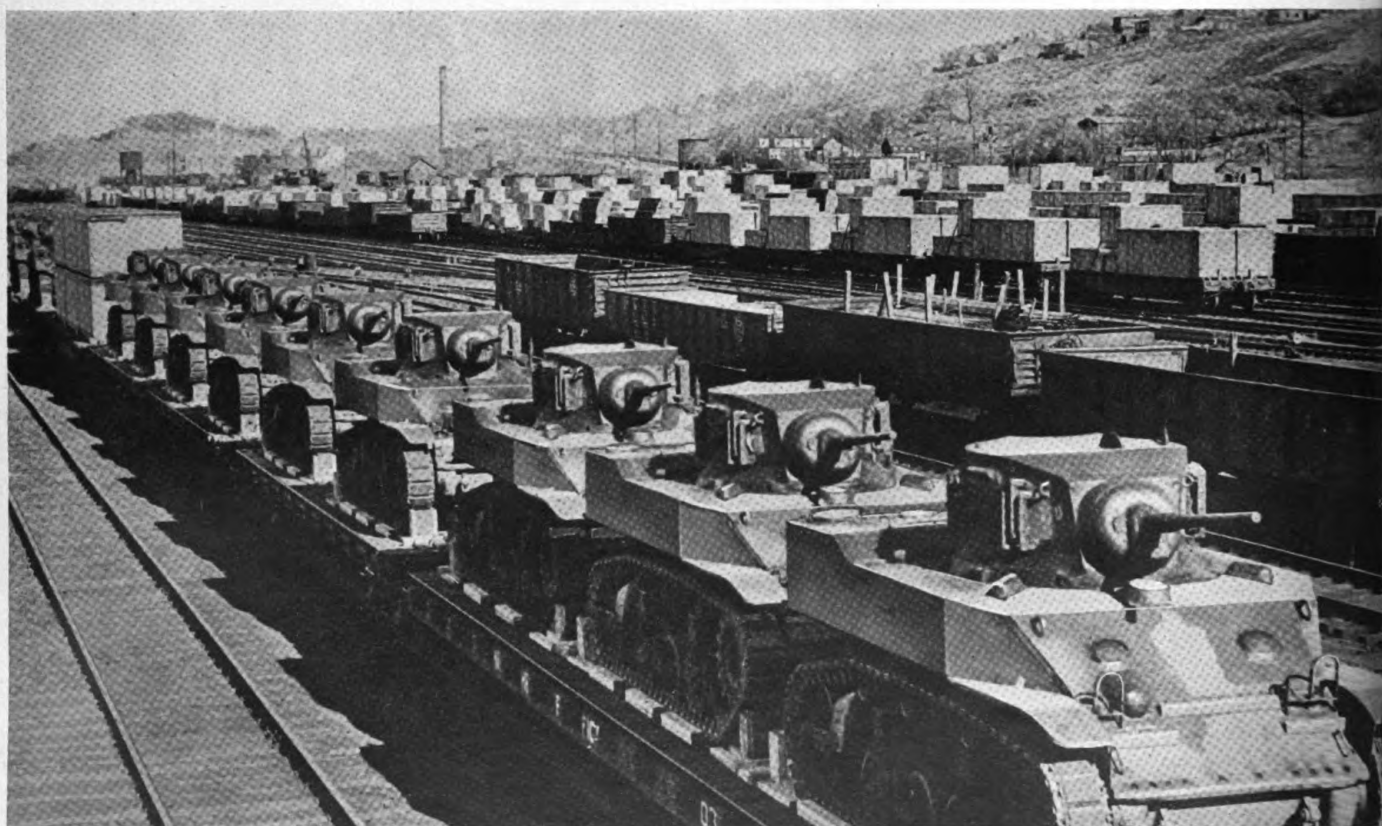
Complete coordination was necessary to insure that the ships available to the United Nations were employed fully and to best advantage. This coordination took place both on a national and an international level. All American shipping, except the relatively small amount owned or chartered by the Army and Navy, was regarded as a pool under the management of the War Shipping Administration. The requirements of the armed services, as determined by the Joint Chiefs of Staff, constituted a first claim against the pool. This American shipping, and a similar pool operated under British control, composed the shipping resources of the United Nations. Strategic decisions affecting the employment of the two pools were made by the Combined Chiefs of Staff, and the necessary interchange of vessels was worked out by the Combined Shipping Adjustment Board. The Chief of Transportation worked in close cooperation with the "joint" and "combined" organizations in all shipping matters.

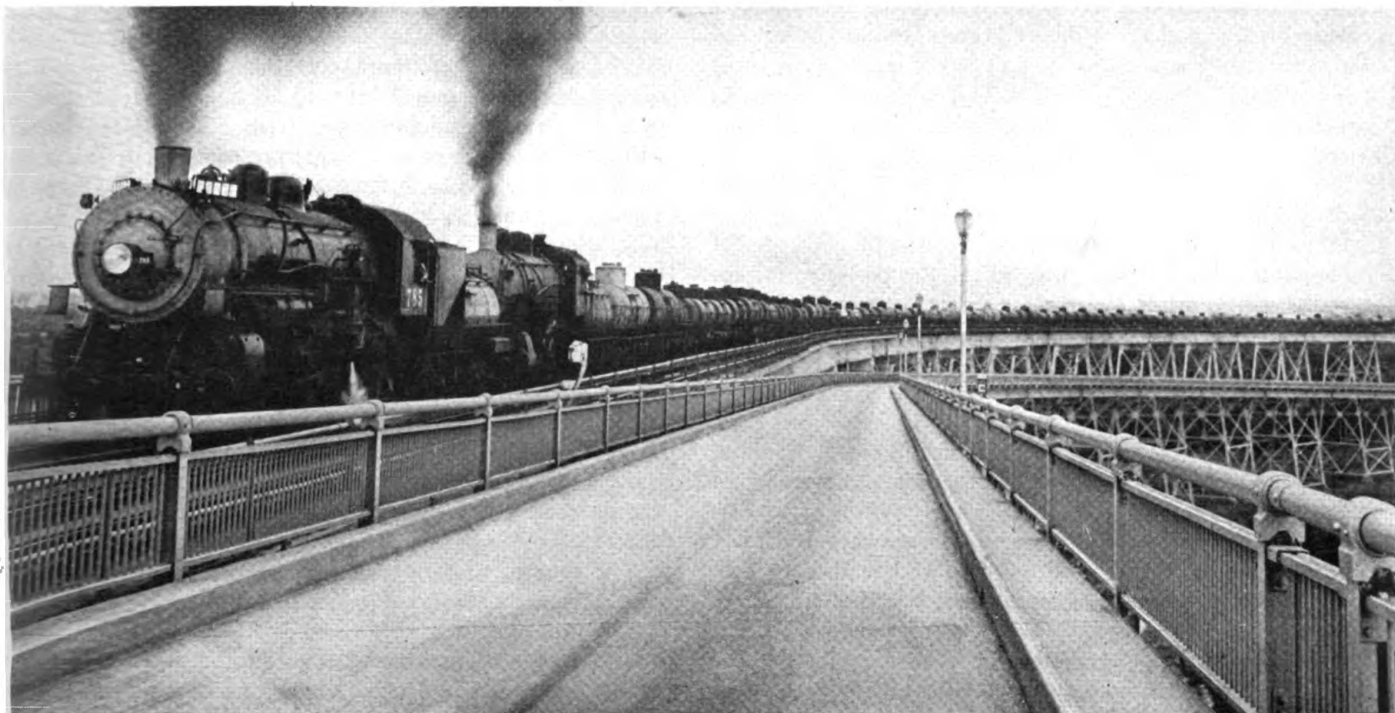
The Domestic Carriers

It is a well remembered fact that during World War I, particularly the first year of our participation, the transportation situation in the zone of interior was confused and constituted a detriment to the military effort. No such situation was permitted to develop in World War II. Although the carriers were hard pressed at times to handle the unprecedented traffic, they were able to do so in a manner that involved no impairment of military effectiveness and only a limited curtailment of civilian privileges.

Several basic factors operated to make the load which fell upon the domestic carriers a heavy one. The war followed a period of general business depression, during which the position of the transportation industries in regard to equipment had undergone some recession. After the United States became a belligerent, the possibility of procuring additional equipment to meet the rising demand for transportation was severely restricted by the prior claims of strictly military supplies upon the available materials and manufacturing facilities of the country. The necessity of withdrawing ships from coastwise and intercoastal services in order to use them on the strategically more important overseas routes, threw a heavy additional burden upon the railways and the highways. The rationing of gasoline and tires and the scarcity of replacement

Under the impact of a wartime economy the American railroads handled an unprecedented volume of freight.





When submarines interrupted the coastwise movement of petroleum, the railways took over a large part of the traffic.

parts forced many private automobiles off the roads, with the result that the large intercity passenger traffic which they normally handled, had to be absorbed by the common carriers. These conditions are reflected in Table I.

Table I. Percentages of intercity passenger and freight traffic handled by the several types of carriers

Passenger traffic (passenger-miles)				
	1941	1942	1943	1944
Railroads	9.6	22.5	34.7	41.4
Motor buses	4.3	8.8	11.6	14.0
Private automobiles	85.1	67.4	52.3	42.9
Inland waterways	.6	.8	.8	.8
Airways	.4	.5	.6	.9
Total	100.0	100.0	100.0	100.0
Freight traffic (ton-miles)				
	1941	1942	1943	1944
Railroads	63.62	70.23	71.97	68.78
Trucks	7.55	5.47	4.72	4.49
Inland waterways	18.55	16.17	13.87	13.52
Pipe lines	10.28	8.13	9.43	13.20
Airways			.01	.01
Total	100.00	100.00	100.00	100.00

Source: *Domestic Transportation*, Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, February-March 1945 and April-May 1945. Percentages based on estimated volume of traffic.

The need for the utmost economy in the employment of transportation equipment was recognized well in advance of our entry into the war, and the creation of the Office of Defense Transportation to deal with this problem followed that event promptly. Possessed of broad authority to regulate operations and eliminate wastage due to overlapping services and inefficient practices, the ODT introduced regulations which contributed to getting the utmost work out of the available transportation resources. Under the ODT mandate, it was possible to set up a system for the over-all control of port-bound traffic, covering commercial shipments as well as those of the Government, which kept the ports free of congestion and permitted a smooth flow of military supplies to the overseas forces at all times. This control system, which leaned heavily upon machinery already created by the Army for the regulation of its own traffic, and was supervised by a committee for which the Chief of Transportation provided the executive staff, was an outstanding success and a conspicuous contribution to the war effort.

Although the American railroads had less equipment in 1941 than in 1917, it was better equipment. Their physical plant generally was greatly improved, and as an industry they were much better organized to meet the emergency. In particular, the establishment of a strong central organization, the Association of American Railroads, was a noteworthy improvement. This organization, which had broad authority to act for its members, maintained headquarters in Washington so that cooperation between the Army Transportation

Corps and the railroads was greatly simplified. As a matter of fact, the Association's Military Transportation Section was located in The Pentagon and functioned as much as an agent of the Army as of the railroads. This same close coordination existed between representatives of the AAR and the Transportation Corps throughout the country.

The pressure of wartime operations was felt by the railroads first in the passenger field. To the heavy demand upon passenger equipment created by the mobilization of large military forces, there was added the necessity for increased business travel and the tendency of the civil population to spend a portion of its mounting income on pleasure trips. Since the military traffic had priority, some curtailment of regular train services was necessary, beginning in 1942, to insure sufficient sleeping cars and coaches for troop trains. More drastic action in that direction was required after the end of the war, to handle the heavy movement of repatriated troops.

In the freight field, the strain upon the railways developed gradually as the war progressed. There were temporary local shortages of certain types of equipment, but through a free interchange of rolling stock between carriers, and persistent efforts to avoid wastage through backhauls, empty hauls, part loads, and other uneconomical practices which characterized peacetime operations, nonmilitary shipments were effected without serious delays and military traffic was handled promptly. The most serious situation developed during the severe winter of 1944-45. Exceptionally bad snow and ice conditions in the northeastern states immobilized large blocks of equipment or slowed down operations to the extent that it was necessary to place several brief embargoes against nonmilitary shipments into that territory. The effect of this situation was felt throughout the country and it was not cleared up until well into the spring. However, except for some restrictions on the movement of less urgently needed types of supplies, which the Army voluntarily placed in effect, shipments destined to the forces at home and overseas moved without delay.

From the end of 1939 to the end of 1944 the number of passenger cars on American railroads increased from 29,685 to 30,997, but between those years the number of passengers carried per car increased from 13.36 to 31.87, and the total revenue passenger miles increased from 22,651,000,000 to 95,549,000,000. During this period the number of freight cars of all types increased only from 1,931,217 to 2,040,514, but the average net tons per loaded car was stepped up from 26.9 to 32.7, while revenue ton miles advanced from 333,438,000,000 to 737,246,000,000. The number of railroad-owned locomotives increased only from 42,511 to 43,612, but the average miles traveled per day increased from 184.2 to 222.9 for active passenger locomotives, and from 104.0 to 122.8 for active freight locomotives. In these figures is reflected the increased efficiency which enabled the railroads to cope with the tremendous traffic which the war threw upon them. This increased efficiency was the result of whole-hearted cooperation between the government agencies concerned, the carriers, and the shippers.

The danger that railway equipment might fall short of requirements in the event of our involvement in the war was foreseen in some quarters at least a year before Pearl Harbor, but no effective steps were taken at that time to prepare for the contingency. The railroads, which for a number of years had experienced a surplus of rolling stock, were disinclined to invest in additional equipment merely on the chance that it might be needed. With somewhat the same point of view, and in line with its policy to rely entirely upon the common carriers for transportation in the zone of interior, the Army was not disposed to procure such equipment. After our entry into the war, the number of new cars and locomotives that could be built without encroaching upon the supply of weapons and other strictly military equipment was severely limited. The railroads were able to procure a small amount of new rolling stock, and Government orders were placed for about 2,400 troop sleepers, 800 troop kitchen cars, and 380 hospital cars.

Between the two wars, motor bus and truck services had undergone great expansion and they played a significant role in the recent conflict. The flexibility of their equipment gave them definite advantages in handling certain types of traffic. The Army, which in the early stages of the emergency stuck to its traditional reliance upon the railroads, found the motor carriers of increased utility as the war progressed. Although the American Trucking Associations and the National Association of Motor Bus Operators did not cover their respective industries as completely as the Association of American Railroads, they were influential agencies and proved exceedingly useful, both to their members and to their shippers, including the Army. The fact that vehicle manufacturing plants were turned over completely to the production of strictly military equipment, the shortage of labor and the scarcity of tires and replacement parts, imposed severe handicaps, but both truck and bus operators did remarkable jobs at maintaining their services and getting maximum results from each unit of equipment.

The inland waterways and the coastwise barge routes also were utilized extensively, and they gave substantial relief to the

Table II. Indexes of traffic handled by the several types of domestic carriers, based on an average for the years 1935-39 as 100

Passenger traffic (passenger-miles)		
	1939	1944
Railroad	103	434
Intercity motor bus	104	292
Air	148	445
Local transit	101	179
Freight traffic (ton-miles)		
	1939	1944
Railroad	104	223
Intercity for-hire truck	114	210
Water-borne	113	68
Pipe line	110	252
Air	132	786

Source: *Domestic Transportation*, Bureau of Foreign and Domestic Commerce, Department of Commerce, Washington, April-May 1945.

railways, particularly in the transportation of bulk commodities. Both steel and concrete barges were built on order of the Office of Defense Transportation to augment these services. The Army established a barge line between Puget Sound and Alaska. The huge boats which brought iron ore down the Great Lakes from the Superior mining regions were powerful factors in maintaining the steel industry at the high level of production which was necessary to meet the requirements of global war. The uneasiness felt over the possibility that the locks at Sault Sainte Marie might be sabotaged in an effort to interrupt that service was evidence of its high strategic value.

The index numbers presented in Table II indicate the extent of the traffic increase handled by the several types of carriers as a result of the war. The marked decline in water-borne freight traffic was due to the withdrawal of ships from the coastwise and Great Lakes routes for oversea service. The great increase in the air freight index must be viewed in the light of the fact that prior to the war the airlines handled only mail and a very limited amount of express freight. The tremendous increase in railway passenger traffic is especially noteworthy.

The Role of Forward Planning

War on so vast a scale demanded long-range planning of the highest order. The opening of new theaters and the launching of repeated assaults against enemy-held territory involved visualization of the requirements for men, matériel and shipping far in advance of the event. When a military operation was finally decided upon, it was with confidence that whatever means might be necessary to its initial and ultimate success would be available. It was the Transportation Corps' responsibility to see that the shipping requirements of the Army were correctly estimated and that the vessels actually were available when needed. While the transportation planning for intratheater operations began in the theaters, the requirements for such operations had to be coordinated with the Transportation Corps' over-all plans and estimates, in order to assure that the necessary vessels would be provided.

Even before the United States entered the war, the critical nature of the shipping situation was clear and a planning staff was set up in the Transportation Branch of the Supply Division, War Department General Staff. The experience which that unit gained in the compilation of shipping requirements for the transportation of various types of troop units and of various kinds of matériel proved highly valuable in the days immediately following Pearl Harbor, when it was necessary to reinforce our oversea bases with the least possible delay and to use the available shipping to the best possible advantage. This experience proved useful also in estimating the amount of new construction that would have to be undertaken to provide the shipping necessary to the conduct of a

When Antwerp was captured the greater part of the docks and equipment was intact.



Temporary docks were constructed at many Pacific bases to facilitate the landing of military supplies.



The port of Marseilles was damaged badly when it fell into Allied hands, but was restored to usefulness quickly.



two-ocean war. In the Transportation Corps, the Planning Division functioned under the supervision of the Chief of Transportation and his Director of Operations.

Early in 1942 the Joint Chiefs of Staff created a Joint Military Transportation Committee to coordinate the shipping requirements of the Army and the Navy, as well as the transportation planning necessary to the prosecution of the war by the armed forces of the United States. The Chief of Transportation was a member of that committee, and also of the Combined Military Transportation Committee which dealt with matters in which both the British and the American shipping pools were involved. His Planning Division participated in all phases of the committee's activities, and one or more of its members attended each conference of the heads of the principal Allied governments, to aid the American delegation in dealing with proposals which involved shipping considerations.

In order to prepare the Army's shipping requirements for presentation to the Joint Military Transportation Committee, the Transportation Corps' planning staff worked closely with the appropriate elements of the War Department General Staff and the Army Service Forces Headquarters, and translated their estimates of troops and matériel to be moved into terms of shipping space. In so doing they relied basically on experience gained in earlier movements. Proceeding in

this way, the estimated amount of shipping space for each soldier sent overseas was materially reduced. The space required for the supplies and equipment which accompanied each man to his overseas station dropped from 10 measurement tons to 5 measurement tons in the course of the war, and the estimated space required for supplies to be shipped each following month for the maintenance of that soldier dropped from 1.4 measurement tons to 0.8 measurement tons. These reductions were possible because of more compact packing and stowing, as well as more precise knowledge of actual overseas requirements.

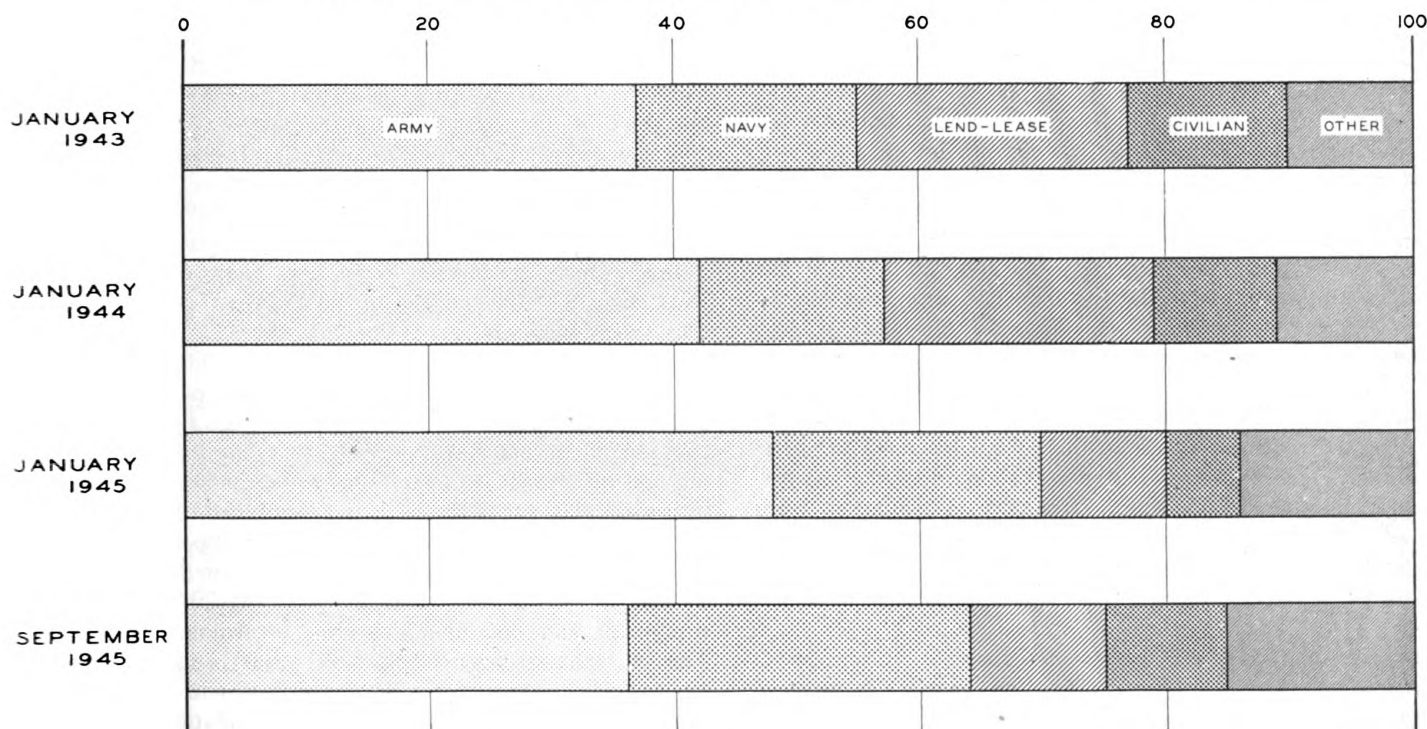
Since shipping was the chief limiting factor, the joint planning procedure was to compute the anticipated shipping capabilities over a period of 6 months or a year, and gear military operations to those capabilities. In other words, operations were not approved without reasonable assurance that there would be transportation to carry them into effect. In such computations the Maritime Commission's estimates of future ship deliveries and the planners' estimates of future ship losses were essential factors. The plans were revised monthly and adjusted to meet any changes in the governing factors. Fortunately, ship completions and ship losses from enemy action could be calculated in advance with fair accuracy, so that no serious alterations in strategical plans were necessary because of the failure of available shipping to measure up to

Landing supplies over the beach at Leyte in the initial move to recapture the Philippines.



CHART NO. 2

PERCENTAGE OF DRY CARGO SHIPPING UNDER UNITED STATES CONTROL SERVING ARMY, NAVY, LEND-LEASE, CIVILIAN AND OTHER REQUIREMENTS — BASED ON DEADWEIGHT TONNAGE



SOURCE: WAR SHIPPING ADMINISTRATION SHIPPING SUMMARY, OCTOBER 1945

expectations. On the other hand, changes in transportation plans to meet new strategical conditions frequently were necessary, and sometimes projected military operations had to be scaled down in order to permit the War Shipping Administration to allocate additional vessels to the movement of lend-lease supplies. In such cases the shipping factors had to be carefully recomputed for all military operations affected.

It was necessary to plan not only the number but also the types of ships which would be needed for anticipated operations. The fleet had to be kept in balance according to the prospective requirements, so that there always would be the right proportion as between troop ship, dry cargo ship, and tank ship capacities. Any unbalance in this respect impaired ability to use all vessels to maximum capacity. Considering the uncertain incidence of sinkings and the necessary changes in strategical plans, this was no simple task.

When we entered the war our cargo lift was relatively greater than our troop lift and orders were placed for many new troop ships. The situation soon was changed, however, due to the hasty conversion of troop transports to increase their capacity, the acquisition of the services of some of the large British passenger liners and the heavy sinkings of cargo ships and tankers. Then in 1943, the tremendous output of new cargo ships, accompanied by a decrease in the rate of sinkings, rendered it expedient to convert cargo ships of the LIBERTY type and

utilize them for the transportation of troops to the active Mediterranean Theater. When Germany's surrender necessitated the redeployment or repatriation of 3,000,000 men with utmost dispatch, the troop lift was further increased by the installation of passenger equipment in about 300 LIBERTY and VICTORY cargo ships. The above gives but the roughest indication of the task which devolved upon the transportation planners in their effort to maintain fleet balance, but it affords a general idea of the problem.

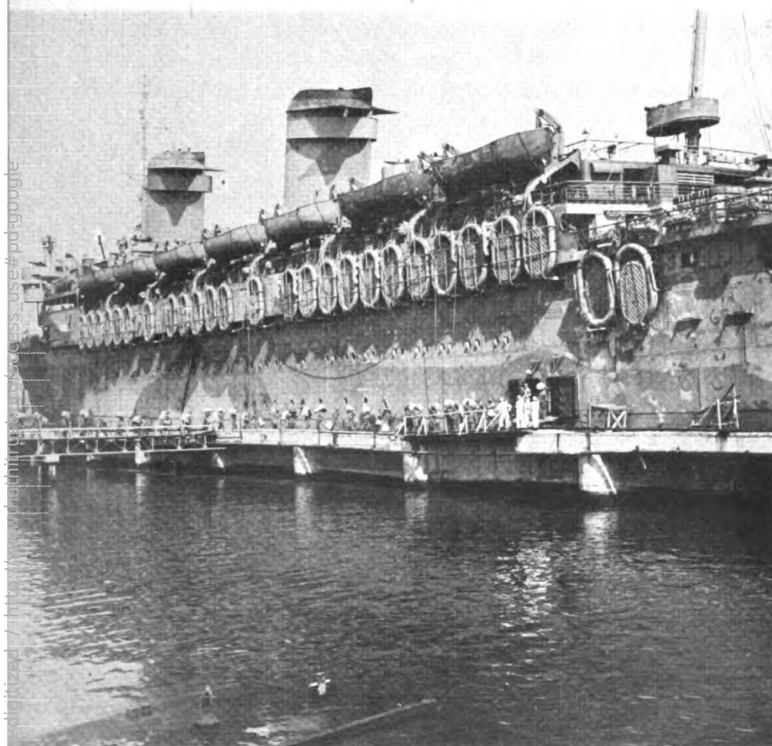
Another factor of primary importance in planning overseas operations was the capacity of the discharge ports to handle the required volume of cargo. In establishing new bases or opening new combat areas, this capacity frequently was a limiting factor. When necessary, assault troops and their supplies could be landed over beaches, but that was a slow and costly process. It was part of the planners' task to estimate the capacities of existing facilities, not only to discharge cargo but to clear it through the ports to Army dumps, and also to estimate how much time would be required to restore demolished docks and warehouses, and to build new facilities where necessary. The situation was not essentially different when our troops occupied ports which had not handled deep water shipping previously.

After port operations had been regularized, the planners endeavored to restrain over-optimistic theaters from calling forward more cargo than they could discharge and holding the

ships in idleness for indefinite periods. Despite all precautions in that direction, however, such a situation obtained in the Southwest Pacific in 1943 and 1944 where the rapidly changing strategical situation frequently caused a change in supply priorities and sometimes made it impracticable to discharge ships at the ports to which they originally had been consigned. A similar condition developed in the European Theater in the latter part of 1944 when failure to capture certain French and Belgian ports as early as had been expected and failure to set up an adequate system of base depots to permit the docks and warehouses at the ports to be cleared promptly resulted in as many as 200 ships being held idle awaiting discharge. Aggressive action in Washington aided by the opening of additional ports cleared up the situation in Europe and improved it in the Southwest Pacific. In the latter instance, however, the kaleidoscopic nature of the operations, together with the lack of large and well-equipped ports, forestalled a complete solution.

Transportation within the theaters also required careful forward planning. Before the assaults upon North Africa, Sicily, Italy, and Continental Europe, the railway networks had been minutely studied, their principal operational facilities located, and their potential capacities estimated. Calculations were made of the amount of American railway equipment that would be required to supplement local equipment, and the number of United States railway operating and shop troops

Within a week after VE-Day, the Transportation Corps embarked troops on the WEST POINT for return to the United States.



that would be needed to augment such native personnel as might become available. Similar studies were made of the railways in Japan and China in anticipation of large-scale invasions into those countries. In like manner, all possible information was gathered regarding the highway networks in all potential combat areas. Sometimes this planning was subject to severe handicaps because the information available regarding highways in many countries was less complete and reliable than that regarding railways. Where new highway projects were anticipated, as in the case of the Ledo Road, complete estimates of equipment and other operating requirements were prepared in the Transportation Corps. Similar though less extensive research was undertaken with regard to inland waterways. Such technical studies were made by the Rail, Highway, and Water Divisions of the Office of the Chief of Transportation, and were coordinated by the Planning Division.

One of the many difficult planning tasks which confronted the Chief of Transportation during the early part of the war was that of programming the delivery of railway and floating equipment to meet future requirements as they developed. On the one hand there was the high degree of flexibility in the strategical planning of the Joint and Combined Chiefs of Staff; on the other, there was the fact that the Transportation Corps was not established until after we were well into the war and as a consequence was at a disadvantage in placing contracts for equipment and obtaining deliveries according to schedule. This problem was appreciably eased when in the summer of 1943 the War Department developed a system under which each future military operation, whether originating in the War Department or in a theater, was set up as a project with itemized equipment requirements. Such projects, once approved, not only served to guide the Chief of Transportation in ordering the matériel for which he had procurement responsibility, but also assisted him in planning ship space for the movement of all matériel embraced in the project.

The fact that Army and Navy activities were so closely interlocked, especially in the Pacific theaters, meant that closest cooperation between the two services was necessary, not only in the broad strategical planning but also in the details of execution. The Joint Staff Planners and the Joint Military Transportation Committee had the major coordinating roles. The Joint Army-Navy Petroleum Board dealt with all phases of the procurement and handling of petroleum products. In the summer of 1942 a Joint Army-Navy Logistical Plan was agreed upon, with a view to the better coordination of the movement of supplies and the more efficient utilization of shipping, particularly in the Pacific. Joint committees, on which the War Shipping Administration also was represented, were established at Pacific coast ports to implement this agreement. In the fall of 1943 a Joint Logistical Committee was set up by the Joint Chiefs of Staff. In May 1945, with the weight of the war effort turned toward Japan, a joint conference was held in Washington with a view to further coordinating the shipping and supply procedures of the Army and the Navy. While progress was made in some directions, the differing principles upon which these activities of the two services were based forestalled the attainment of complete harmony.



Fifteen thousand returning troops arrive at New York on the QUEEN MARY.

The Army Transportation Corps

Although a more extensive account of organizational developments and administrative problems in the Transportation Corps will be given in later sections of this report, a few facts regarding the Corps' establishment and early history, presented at this point, will be helpful as background for the discussion of operating problems and accomplishments which is to follow.

The most significant facts to be noted are that an integrated transportation service did not come into existence until three months after the United States entered the war; that its transition into the Transportation Corps did not take place until several months more had passed; and that the final substantial addition to the Corps' responsibilities came almost a year after Pearl Harbor. Thus the new transportation service was under the necessity of building up its organization and establishing procedures while also coping with unprecedented operating problems during the most critical phase of the war.

During the peace period the movement of troops and supplies by common carriers in the zone of interior, and by Army transports and commercial vessels between the United States and our overseas bases was the responsibility of The Quartermaster General. The Chief of Engineers was responsible for the construction of military and utility railroads, the procurement of all railroad equipment required by the Army, the training of railroad troop units, and the operation and maintenance of military railroads; The Quartermaster General was responsible for the operation and maintenance of utility rail-

roads, except at installations which were under the exclusive control of other supply services. The commanders of ports of embarkation reported directly to the War Department General Staff, and the line of demarkation between their duties with regard to Army transports and those of The Quartermaster General was not clearly drawn. As matters were developing in the fall of 1941, the commanders of the two holding and reconsignment points which were being built to aid in the regulation of the flow of traffic to the ports, also were to be responsible directly to the General Staff. Over-all supervision of these activities was exercised by the Supply Division (G-4) of the General Staff.

This decentralization of transportation operations was in line with the Army Reorganization Act of 1920, which disregarded the recommendations of the War Department for the establishment of a permanent Transportation Corps, although the experiences of World War I had shown such a corps to be highly desirable. The situation was further complicated by the fact that those elements of the Army which had heavy procurement and shipping responsibilities—notably the Ordnance Department, Corps of Engineers, and Air Corps—had developed traffic organizations of their own, which in their eagerness to move supplies without delay sometimes encroached upon The Quartermaster General's sphere. Also, the Office of the Assistant Secretary of War, in connection with its procurement responsibilities, had concerned itself with the general aspects of transportation, largely in duplication of the activities of G-4.

As the size of the Army increased under the Selective Service Act of September 1940, and the extension and strengthening of our system of overseas bases progressed, the Army's

transportation problems grew in both size and complexity. In this situation the decentralization of operating responsibilities was a definite handicap. The necessary and logical solution was for G-4 to assume the authority required to effect the coordination of Army transportation activities, even though this would involve stepping outside the recognized sphere of the General Staff. Accordingly, in the spring of 1941, the Transportation Branch of G-4 began to expand, and by early December it embraced sections to deal with the respective types of transportation, as well as planning and administrative matters. Following our entry into the war this expansion increased at a quickened pace.

The weaknesses of this cumbersome arrangement were accentuated during the pressure period immediately following Pearl Harbor. The most earnest cooperation of all concerned could not overcome the faults inherent in the system. It was abundantly clear that a revision of the transportation set-up was highly desirable and that it should be accomplished without delay.

The first step in that direction was taken in connection with the Army reorganization which became effective 9 March 1942. A Transportation Division (soon renamed Transportation Service) was established as one of the components of the newly created Services of Supply (predecessor to the Army Service Forces). The new Transportation Division took over the personnel and responsibilities of the Transportation Branch of G-4 and the Transportation Division in the Office of The Quartermaster General. The new Chief of Transportation was made responsible also for the ports of embarkation and the holding and reconsignment points. Steps were taken promptly to eliminate duplicating staffs and activities in other elements of the War Department.

This measure of integration was a step in the right direction, but it fell short of the desired goal. The personnel of the new Transportation Service was made up entirely of officers who had been detailed from various other services and thus lacked uniform training, a common point of view, and a single allegiance. The transportation officers at Army installations in the zone of interior were appointed by the commanders of those installations, and the Chief of Transportation had little or no supervision of their activities. The Chief of Transportation also lacked proper relationships with the transportation officers with the forces in the field. No adequate provision had been made for the training of transportation troop units. Recommendations looking to the correction of these shortcomings were prepared in June 1942, with the result that a Transportation Corps was created by the War Department under its wartime powers, effective 31 July 1942.

Responsibility for the procurement of floating equipment had been taken over by the Transportation Service from The Quartermaster General in March 1942. At the same time it took over the training of port headquarters and port battalions,

which had been conducted at the ports of embarkation, although this responsibility was not formally transferred from The Quartermaster General until the Transportation Corps was created in July 1942. The operation and maintenance of way and equipment of military railways were transferred from the Corps of Engineers to the Transportation Corps in September 1942, and the operation and maintenance of equipment of utility railroads were transferred from the Quartermaster Corps at the same time. The design, procurement, storage, and issue of all railway equipment, the training of railway troop organizations, and the entire Military Railway Service were transferred from the Corps of Engineers to the Transportation Corps in November 1942.

No further significant transfers of responsibility to the Transportation Corps took place during the war. The procurement of motor vehicles remained with the Ordnance Department, and the training of truck companies was handled chiefly by the Army Ground Forces and Army Air Forces.

The control of air traffic within the zone of interior and to the oversea theaters and bases, was begun by the Transportation Branch of G-4 and continued by the Chief of Transportation until 1 July 1942, when it was transferred to the Army Air Forces by War Department directive. The Chief of Transportation, who had built up a staff to handle this traffic, opposed the transfer on the ground that movements by air and surface carriers required careful coordination and that this could be accomplished best if all traffic were controlled by one agency. He contended also that his organization was in the best position to administer priorities for the movement of personnel and supplies by air. The experiences of the war justified those claims.

The gradual increase in the responsibilities of the Chief of Transportation in regard to transportation, training, and procurement had been accompanied by the establishment of a variety of new field agencies, as well as the opening of additional ports of embarkation. In December 1942 all agencies, except the ports of embarkation, and the headquarters of the Military Railway Service which were soon to move overseas, were placed under the direction of nine zone transportation officers. The transportation zones were coextensive with the nine service commands, and the zone officers were located in the same cities as the service command headquarters.

Thus, in 1943 and 1944 the organization in the zone of interior consisted of the Office of the Chief of Transportation, the ports of embarkation with their subports and cargo ports, and the transportation zones with their subordinate installations. In 1945 the existing field organization was changed somewhat by the removal of the field procurement offices and the supply depots from the jurisdiction of the zone transportation officers, and the Transportation Corps Board was set up as an added field agency to carry on research and development work over the entire range of Transportation Corps activity.

INLAND TRANSPORTATION

It has been the general policy of the War Department to utilize the common carriers in the zone of interior, rather than to establish and operate Army transportation systems. This has proved satisfactory in times of war as well as of peace, and departures from the policy have been found necessary only in isolated instances. Such departures have been made only when unusual conditions encountered by the common carriers have affected or threatened to affect their services to the extent of interfering with essential military traffic.

Recognizing the difficulties under which the carriers were obliged to work in view of wartime shortages and restrictions, the Transportation Corps endeavored to aid them in every way possible to maintain their services. The Corps supported the railroads in their endeavors to obtain allocations of scarce materials for the construction of additional equipment, and in their applications for special amortization for tax purposes in connection with new facilities acquired specifically to meet war conditions. The motor carriers were aided in obtaining new vehicles, as well as tires and spare parts, through intercessions with the Government agencies concerned and with manufacturers and dealers. The Transportation Corps assisted the carriers to meet the manpower shortage in a variety of ways, and placed troops at their disposal to meet special emergencies. The Corps exercised all possible influence to prevent work stoppages, and to bring about a resumption of work when strikes occurred.

The Transportation Corps was the operating agency of the War Department when it took control of the American railroads on 27 December 1943. Because continued operation of the railroads by their managements was threatened by strikes scheduled to begin 30 December, the President, by Executive Order, empowered and directed the Secretary of War "to manage and operate or arrange for the management and operation of the carriers," in such manner as might be necessary to assure continuous and uninterrupted transportation service. The Secretary of War delegated his authority to the Commanding General, Army Service Forces, who in turn charged the Chief of Transportation with direct responsibility for operations. A comprehensive plan for the possession, control, and operation of the railroads by the Army, which had been prepared in advance of the emergency, was placed in effect immediately. The president of a large railroad was appointed principal advisor to the War Department. Seven leading railroad executives

were commissioned colonels and appointed regional directors. The field personnel of the Transportation Corps, augmented by staff officers provided by the service commands, was organized to operate under the supervision of the regional directors. The plan contemplated that the Army would leave operations in the hands of the railroad managements unless a different course should become necessary. Fortunately this did not eventuate, and following the settlement of the dispute between labor and management, the Army relinquished control of the railroads on 18 January 1944. An interruption or impairment of service at that time would have had serious military implications.

A close relationship was formed with the Office of Defense Transportation at the time of its establishment and maintained thereafter. The attitude of the Chief of Transportation was that all regulations of ODT, which increased the efficiency of the national transportation system and promoted a smooth flow of traffic, were essential to the war effort and should be fully supported by the Army. An understanding was reached that all such regulations would be submitted for clearance by the Chief of Transportation before being placed in effect, and when these regulations interposed difficulties in the way of the Army's transportation operations, which were not offset by the general improvement which they would effect, ODT was requested to make an exception of military traffic. Generally speaking this arrangement worked out satisfactorily to the Army, though in some instances arbitrary action by ODT proved embarrassing until correction was made.

Close working relations were maintained also with the Public Roads Administration in all matters affecting Army highway transportation. Under Public Law 521, 78th Congress, PRA has been engaged in developing a national system of interstate highways, so located as to link up the principal industrial areas in the United States, connect at suitable border points with routes in Canada and Mexico, and adequately serve the national defense. The War Department was requested to cooperate with PRA in matters affecting military uses and requirements, and for some months the Transportation Corps was engaged in studies to determine what changes should be recommended in a network preliminarily proposed by the National Interregional Highway Committee.

One section of Army inland freight traffic was not under the direct control of the Chief of Transportation—that of the

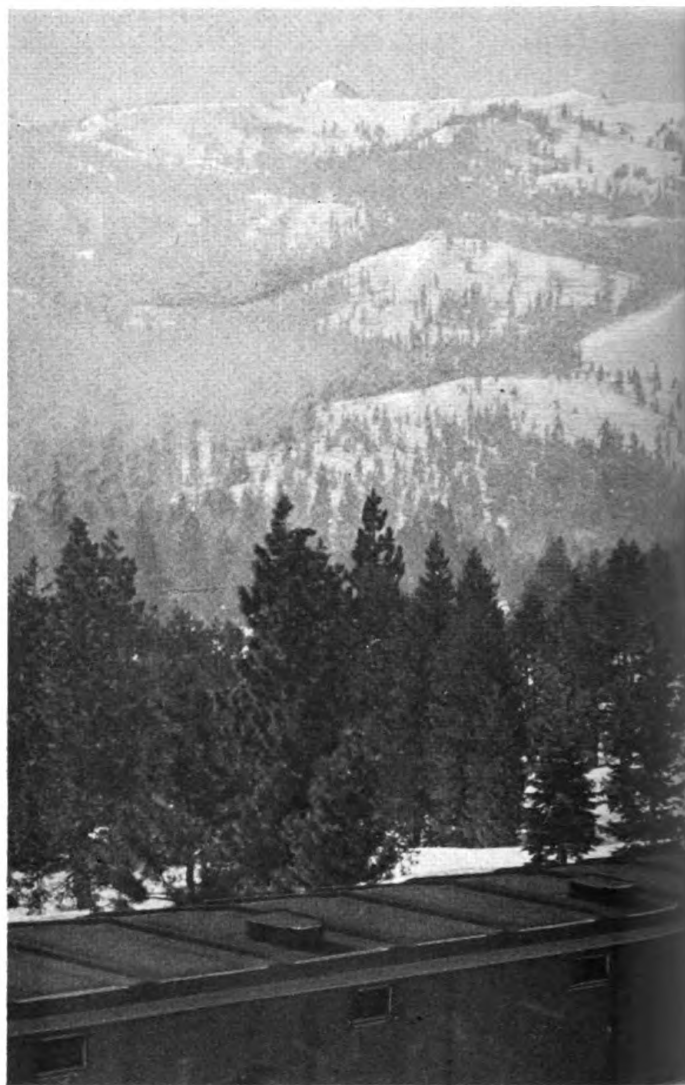
Army Air Forces. The War Department regulation which established an integrated transportation service in March 1942, made no exception of that traffic. However, prior to that time the Air Corps had established a traffic organization and developed techniques and procedures, which it contended could not be transferred without an adverse effect upon its over-all operations. Under these circumstances the Chief of Transportation temporarily delegated the requisite authority to the Army Air Forces, to enable them to continue the day-to-day management of their own freight traffic, but reserved the right to establish policies and to represent the War Department in dealings with other Government agencies. Despite the good intentions of all parties, such a divided responsibility could not exist without giving rise to inconsistencies and misunderstandings, and the arrangement should be terminated as soon as conditions make this possible.

Inland Passenger Traffic

During the period of our participation in the war—a period of 45 months from December 1941 through August 1945—the Office of the Chief of Transportation routed 33,678,000 passengers in organized groups of 40 or more. Of this total, 32,881,000 (97.6 percent) were routed by rail, and 797,000 (2.4 percent) by motorbus. The best comparable data for World War I indicate that 5,046,000 passengers were moved by special train during a period of 18½ months, from 1 May 1917 through 10 November 1918.

Under Army regulations all organized groups of 40 or more traveling on War Department orders were routed by the Office of the Chief of Transportation. Smaller groups and individuals were routed by the transportation officers at points of origin. In all cases where the groups consisted of 15 or more and traveled by railroad, the routings were worked out initially by the respective territorial passenger associations of the railroads. The War Department relied upon those associations to effect the proper distribution of traffic among the individual carriers, and look after other railroad interests. When the routings proposed by the associations did not meet Army requirements, appropriate changes were requested. Representatives of the passenger associations were stationed in the Traffic Control Division of the Office of the Chief of Transportation, as well as at the larger Army installations, so that such adjustments were made quickly.

The objective during the war was to provide sleeping cars for troops en route over 12 hours, whose trips terminated after midnight. Due to the shortage of sleeping cars it frequently was not possible to adhere to that plan, and it sometimes was necessary in order to carry out prescribed schedules, to require troops to travel in coaches one or more nights. When traveling by tourist sleeper, two men were assigned to a lower berth and one to an upper. One of the 14 sections was reserved for other than sleeping purposes, so that the usual complement was 39 men to a sleeping car. In normal coach travel, three men were assigned to two seats, but when coaches were used for overnight or very long trips an effort was made to assign only one man to a seat.



When a sufficient number of troop cars was moving over a given route, special troop trains were made up, since this greatly simplified the control of the movement and the discipline of the men, as compared with troop cars attached to regular trains. Each troop train was in charge of a troop train commander and was attended by a medical officer. The troop train commander appointed an assistant, a baggage officer, a mess officer, and a commander for each car to maintain discipline and enforce sanitary regulations. A troop kitchen car was assigned to each train carrying 100 or more troops, and an additional kitchen car was added if the number exceeded 250. Baggage cars were fitted up by the Army to serve as kitchen cars, until specially built kitchen cars were provided by the Government. Sometimes the trains included boxcars and flat cars, the latter for heavy organizational equipment such as tanks and artillery.



A train of Government-owned troop sleepers winds through the mountains.

During the years 1943 and 1944 the railways assigned the following equipment to move troops and other passengers traveling in groups of 40 or more:

	1943	1944
Tourist sleepers.....	137,421	138,253
Coaches.....	97,635	55,987
Baggage cars.....	45,444	37,612
Flat cars.....	47,454	13,732
Standard sleepers.....	3,077	3,134
Boxcars and miscellaneous.....	14,759	25,330
Total.....	345,790	274,048

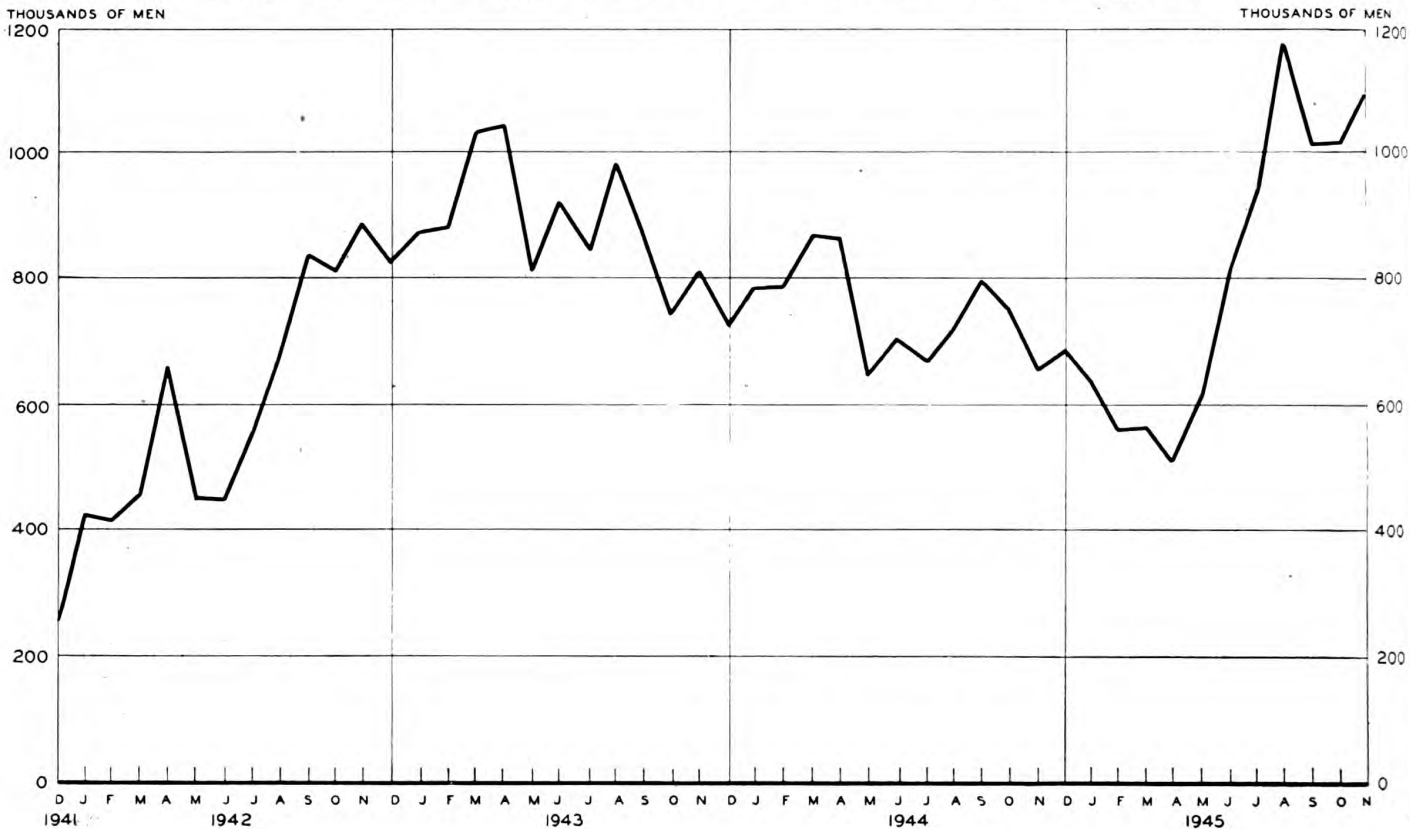
In the spring of 1943 when troop movements were especially heavy, the armed forces at times used as much as 50 percent of the sleeping car equipment available in the country and 30 percent of the coaches. It then was decided to build 1,200

special troop sleepers, and also 400 special troop kitchen cars, with funds provided by the Defense Plant Corporation. The sleepers, although light and of very simple design, were well-equipped and each provided 30 berths in tiers of three. They were turned over to the Pullman Company for operation. When it became evident that the redeployment and demobilization of forces from Europe would require an unprecedented amount of sleeping car space, additional orders were placed for 1,200 troop sleepers and 400 kitchen cars. Unfortunately, delivery of the sleepers was seriously delayed by strikes.

When troop movement orders involving considerable numbers were being drawn up by the Operations Division of the General Staff, representatives of the Traffic Control Division of the Office of the Chief of Transportation were taken into consultation regarding any transportation or traffic factors which might affect the movement. In this way peaks and valleys of

CHART NO. 3

TROOPS ROUTED MONTHLY BY RAIL, ORGANIZED GROUPS OF FORTY OR MORE, IN THE ZONE OF INTERIOR



troop travel were leveled off and it was possible to schedule movements so that railway equipment would be released by one group in time for it to be used by another group leaving from the same general area. Eventually it was arranged that departure times would be left flexible and that the Office of the Chief of Transportation would be permitted to adjust them within a limit of 72 hours. By so doing it was possible to work out a much more economical utilization of railway equipment through a reduction in the deadheading of passenger cars.

An organized troop movement, whether it moved by special train or in special cars on a regular train, was under the control of the Office of the Chief of Transportation from point of origin to destination. Times of departure and arrival were reported by both the unit commanders and the railroads. The carriers also gave passing reports at each junction point to the Association of American Railroads. This information was available to the Army when needed, and it was useful not only in forecasting arrivals at destinations, but more particularly in arranging for diversions. During the strenuous days following 7 December 1941, when many troop units were being moved to new stations within the country or to ports of embarkation, and when hastily prepared plans were subject to sudden change, this complete reporting system was of inestimable value.

In order to properly care for the sick and wounded returned

to this country from overseas theaters, and to reduce the number of Pullman cars required to handle patients, the Army built 320 hospital ward cars during the war, and also 60 hospital kitchen cars. Designed according to the most up-to-date standards of equipment, ventilation, and safety, these cars were operated by the service commands, which assigned them to the several ports in proportion to the volume of the traffic to be handled. The Movements Division of the Office of the Chief of Transportation, acting in conjunction with The Surgeon General, indicated the number of cars required to meet each incoming hospital ship, or regular transport carrying patients. The ports maintained specially trained troop units to move the patients from ships to trains.

Prisoners of war were moved in groups, generally by special trains and always in coaches. Exceptions to this general rule were made only in the case of patients. Special cars were provided by the railroads for the movement of such prisoners. All windows were blocked so that they could be opened only a few inches, and all emergency tools were sealed. Only cars allowing unobstructed view from one end to the other were utilized, and all interior doors were removed. The Provost Marshal General provided the guards for these cars.

Passenger fares paid by the War Department were in accordance with the Military Passenger Agreement which was

negotiated annually with the railroads by the Army, Navy, Marine Corps, and Coast Guard, acting jointly. The agreement provided for reduced rates for military traffic. Advantage was taken also of land-grant rates, where applicable. There was no general rate agreement with the bus operators, and bus service was obtained either under charter terms or at tariff fares. Although the motor carriers often could provide more satisfactory service for the smaller groups moving over the shorter distances, generally speaking the railroads were preferred for military movements because of their ability to handle larger groups with better control, their sleeping car and kitchen car facilities, and their ability to transport bulky equipment with the troops.

The tremendous increase in railway passenger traffic, both military and civilian, made it progressively more difficult to obtain reservations on Pullman cars and reserved-seat coaches. As a result, Army officers and other employees traveling on official business frequently found it impossible to maintain their travel schedules, and personnel on leave of absence or furlough often were delayed. To meet this situation the railroads, in June 1942, arranged to hold blocks of space for the use of the Army, Navy, and certain other Government agencies. Early in 1943 the War Department began establishing Army reservation bureaus in convenient locations at the principal railway centers. Eventually 92 such bureaus and branches were functioning. Operated by the Chief of Transportation and staffed with trained personnel, these agencies greatly eased the problems of both travelers and railroads. Up to the end of hostilities they had dealt with more than 5,000,000 requests, and had succeeded in making the reservations as requested in all but 4.1 percent of the cases. During 1943 the proportion of failures was 8.5 percent, but during the first 6 months of 1945 it was only 3.0 percent. Navy,

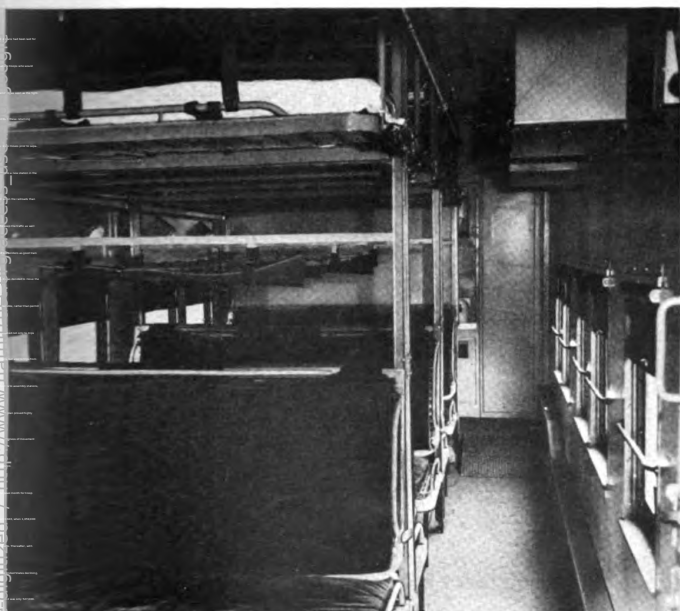
Marine Corps, and Coast Guard personnel were permitted to use the Army reservation bureaus in places where their own service did not provide a similar facility.

Handling Returning Troops

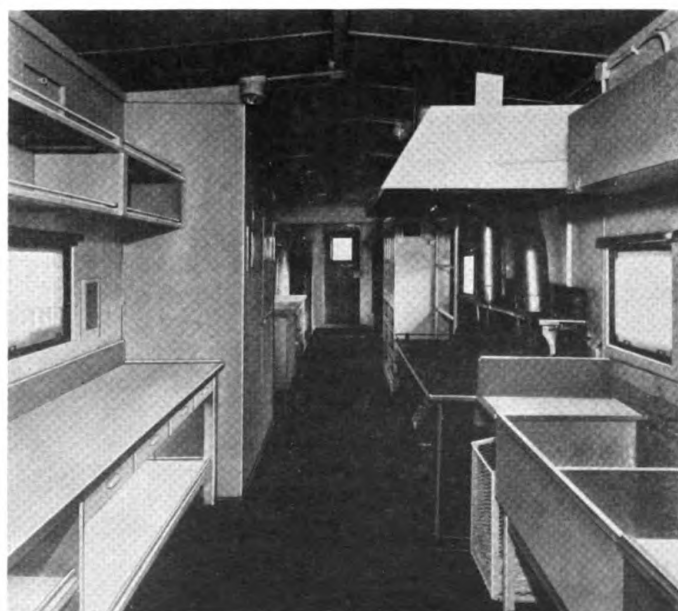
Before the German surrender, careful plans had been laid for handling the inland transportation of the troops who would begin pouring into our Atlantic coast ports as soon as the fighting in Europe ceased. It was evident that these returning troops, each man making from two to six moves prior to separation from the service or embarkation to a new station in the Pacific, would impose a heavier burden on the railroads than they previously had encountered. To keep the traffic as well under control as possible and afford the soldiers as good train accommodations as could be given, it was decided to move the men in organized parties whenever feasible, rather than permit them to travel as individuals. * This applied not only to trips from the ports to the personnel centers, but also to trips from personnel centers to homes, from homes to assembly stations, and to whatever trips might follow. The plan proved highly satisfactory from the standpoint of orderliness of movement and economical use of railroad equipment.

Prior to the German capitulation, the peak month for troop traffic in the zone of interior was April 1943, when 1,059,000 men were routed in groups of 40 or more. Thereafter, with the number of troops remaining in the United States declining, this traffic diminished and in April 1945 it was only 527,000. Then with the beginning of redeployment from Europe it began to mount, and in August 1945 a new high of 1,205,000 was reached. Of that number, 1,174,000 moved by rail and 31,000 by bus. August, no doubt, was the peak month for the entire war period, since after VJ-Day troop moves for training

The equipment of the specially designed troop sleeper was utilitarian but comfortable.



The special troop kitchen cars built by the Government were highly efficient units.





The transcontinental troop train was not without its amenities.



Army Reservation Bureaus operated by the Transportation Corps assisted the uniformed men of all services.



purposes and movements to the ports of embarkation were greatly reduced.

The heavy arrivals of Army and Navy personnel at Pacific coast ports in November 1945 overtaxed the rail facilities, with the result that many men were detained at the port disposition centers several days beyond the normal period, because rail equipment could not be furnished promptly for transporting them to the personnel centers. The basic difficulty was availability of cars. A much larger number of men had to be moved from Pacific coast ports to the eastern states than from the eastern seaboard to the western states, so that the number of cars leaving the west coast was greater than the number arriving. Failure, on account of strikes in manufacturing plants, to obtain scheduled deliveries of the special troop sleepers which had been ordered in the spring of 1945, had a material bearing on the situation.

Various measures were taken to improve this condition. The Office of Defense Transportation and the railroads were called upon to divert cars, both sleepers and coaches, from regular train service to handle troop traffic. A thousand additional cars were obtained in this manner, and several hundred of them were deadheaded to the Pacific coast so that they could be used to move troops from the disposition centers with the least possible delay. The Transportation Corps arranged for Army cots to be converted and installed in 312 troop sleepers which had been completed except for the installation of berths—work which had been stopped because the manufacturer's plant was strikebound. As many Army hospital cars as could be spared from transporting patients were assigned to troop traffic. The Office of Defense Transportation was requested to raise from 450 to 500 miles the minimum distance over which sleeping cars could be used in regular train services, in order to make more of these cars available for troops, but the request was not granted.

When the heavy return movement began in the summer of 1945, it was arranged that troops would be moved by air from both coasts. In October 32,000 troops were so moved, approximately half from Atlantic and half from Pacific ports. In view of the situation which developed in November, and the even more difficult situation which was in prospect for December, arrangements were made for troops to use 10,000 additional airplane seats per month from the Pacific coast. This additional allotment represented about 70 percent of the available eastbound space on the commercial air lines.

Inland Freight Traffic

From December 1941 through August 1945, the freight moving on War Department bills of lading totaled 324,891,000 short tons. This movement, which began with 1,600,000 tons in the first month of the war, reached a peak of 11,001,000 tons in March 1945, and then began to decline as the German resistance weakened and the end of the war in Europe appeared to be near. The heaviest monthly movement of War Depart-

Troop unit equipment moving on open railway cars was well guarded en route.

ment freight by rail during World War I was 1,105,000 tons in October 1918. The volume increased after the Armistice to a peak of 1,446,000 tons in March 1919.

All carload shipments, whether domestic or for export, were routed by the Office of the Chief of Transportation. As many as 40,000 route orders were issued in a single month. A substantial part of the less-than-carload shipments was handled by the consolidated car service which the Transportation Corps operated. Other LCL shipments were routed by the transportation officers at points of origin. An analysis by carrier (except air) of freight moving on War Department bills of lading during the 45-month period, December 1941—August 1945, follows:

	Short tons	Percent
Rail—carload	288,142,000	88.7
Rail—LCL	4,880,000	1.5
Rail—express	1,099,000	.3
Motor carrier	26,534,000	8.2
Inland waterway	4,236,000	1.3
Total	324,891,000	100.0

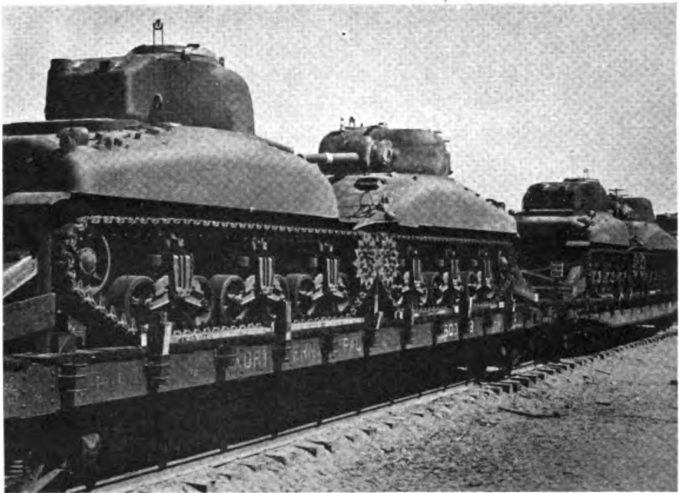
On the basis of ton-miles, War Department freight transported by the railroads was 5.1 percent of their total freight in 1942, and increased to 12.5 percent of the total in June of 1945. As between the year 1942 and 11 months of 1945, the average distance covered by War Department shipments by rail increased from 700 to 780 miles.

In normal times the choice of routes for shipments was determined primarily on the basis of rates. During the war this requirement was relaxed and military expediency was given precedence. However, the matter of rates never was lost sight of, and in a large percentage of cases it continued to be the governing factor. A complete file of tariffs was maintained in the Traffic Control Division in the Office of the Chief of Transportation, as well as a staff trained in the utilization of these tariffs and in the very intricate problems involved in the use of land-grant rates.

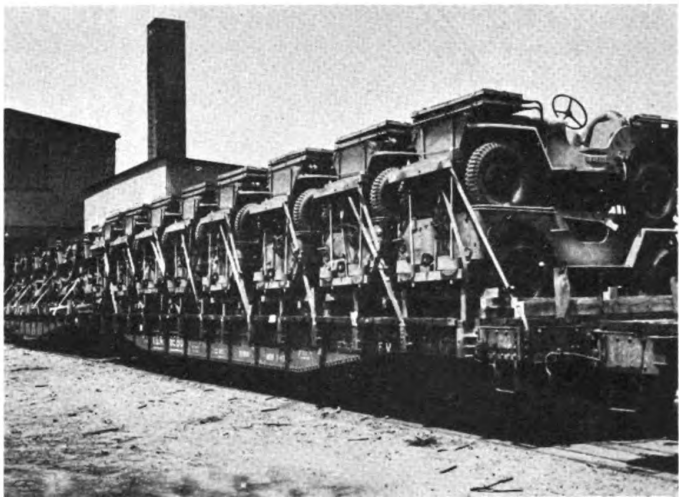
Very thorough studies were made with a view to saving freight charges for the War Department. Rate reductions were obtained by negotiation with the carriers, or, when necessary, by formal proceedings before regulatory bodies. Classification ratings as applied to War Department items were adjusted to make them more equitable, and numerous new ratings were worked out with the carriers on a fair basis. With about a million items in use by the Army, classification ratings presented a large and intricate problem. Storage in transit privileges were made applicable to a large number of Army installations, resulting in reduced transportation costs. It was estimated that the savings in freight charges thus effected were on the basis of about \$60,000,000 annually.

The Transportation Corps conducted a persistent campaign against wasteful detention of cars at Army installations. One feature of this campaign was a monthly report showing the

Motor towing launches with demountable cabins were moved across the continent by rail.



The demand for flatcars to move military equipment was heavy, but requirements always were met.



Sixteen quarter-ton trucks double-decked on a flatcar took full advantage of car capacity and railway clearances.

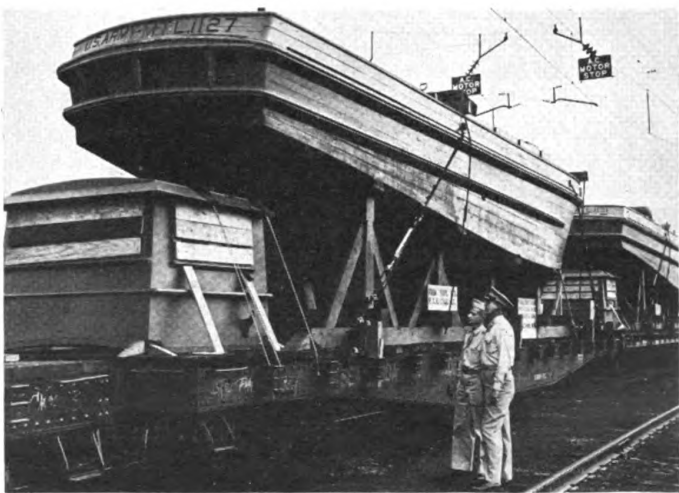
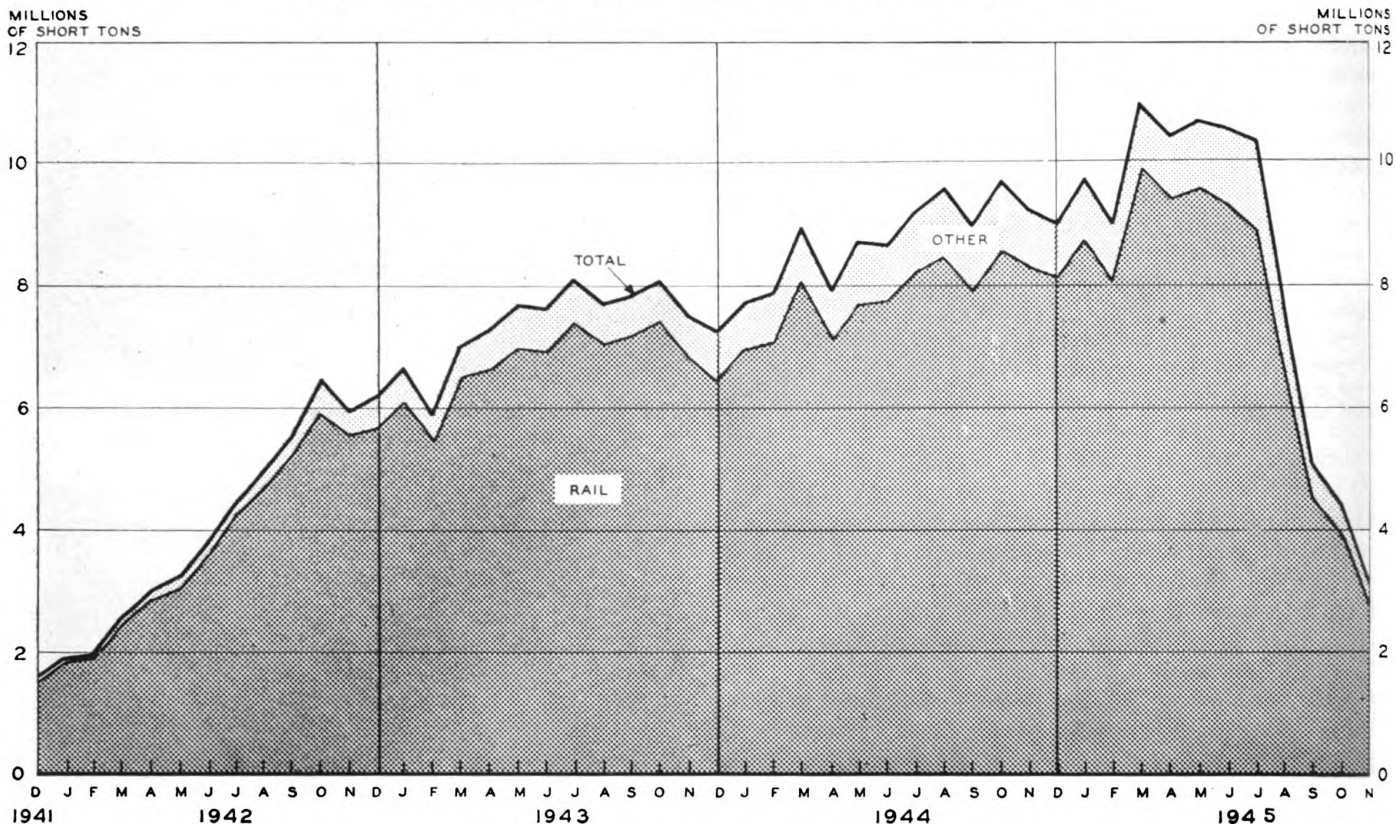


CHART NO. 4

SHORT TONS OF FREIGHT MOVED MONTHLY IN THE ZONE OF INTERIOR, ON WAR DEPARTMENT
BILLS OF LADING, BY ALL COMMERCIAL CARRIERS EXCEPT AIR



speed with which cars were unloaded and released at more than 200 of the Army's largest freight handling points. The report was sent to the installations studied, and since it showed their relative standing, it created a spirit of competition among them. As a result, between July 1944 and July 1945 the percentage of cars released before the expiration of 24 hours increased from 62 to 71, and the percentage held beyond the 48-hour free period decreased from 14 to 7. This meant not only that the cars were put back in circulation more quickly, but also that demurrage charges were reduced substantially.

The Transportation Corps gave its full support to the movement, which was country-wide, for the full utilization of freight car space. The transportation officers in the field constantly were impressed with this necessity, and coached in techniques. As a result, the average weight of War Department freight loaded in a car increased from 28.9 short tons in April 1943 to 30.0 tons in June 1945. That the War Department average was less than the over-all average was due to the fact that so large a part of Army freight is made up of types which are light in proportion to their bulk. Vehicles, for example, constituted more than 10 percent of the total Army freight moved by rail. Other types required special stowing, which consumed space.

Methods of stowing, blocking, and bracing large Army equipment, such as vehicles, tanks, and artillery, were greatly improved during the war. In the early stages these improvements generally were developed by the respective arms and services—notably the Ordnance Department and the Armored Force Board—in direct dealings with the loading rules committees of the railroads, and frequently without consultation with the Transportation Corps. Later the Transportation Corps itself initiated proposals and conducted experiments to test their practicability. Early in 1945 the Chief of Transportation was specifically assigned staff supervision over all car loading procedures, with control over liaison between the arms and services and the railroad loading rules committees.

Wastage through cross-hauling and back-hauling also received constant attention in the Office of the Chief of Transportation. The seriousness of such practices, in the light of the car shortage, was broadcast to all transportation officers. By studying the route orders for specific commodities it was possible for the Traffic Control Division to discover what seemed to be avoidable cross-hauls and back-hauls, and such cases were brought to the attention of the procuring services involved. It was then the responsibility of those services to work out such changes in future shipping programs as might be feasible.

Table III. Origins of War Department carload freight as disclosed by an analysis of bills of lading for the 5-month period, August-December 1944

Origin	Carloads	Percent
Industrial (vendor) plants.....	653,000	47.7
Army depots.....	363,000	26.5
Industrial (Army) plants.....	149,000	10.9
Posts, camps, stations, ports.....	114,000	8.3
Holding and reconsignment points.....	30,000	2.2
Commercial warehouses.....	28,000	2.0
Army-Navy consolidating stations.....	18,000	1.3
Miscellaneous.....	15,000	1.1
Total.....	1,370,000	100.0

Throughout the war specially expedited freight shipments were necessary to meet theater requirements. Orders for such service were given only by the Transportation Corps. During the critical stages of the invasion of Germany, expedited shipments of ammunition were run directly from ordnance plants to ports to meet carefully phased convoy sailings. Following our occupation of Attu and Kiska, a shipment of 169 sorely needed tractors was rushed to the San Francisco Port of Embarkation from Peoria, Illinois, by utilizing all highspeed box cars available in the vicinity and running them through to the port in two special trains. These are only examples of a procedure which became almost routine. When dealing with

such movements, the Transportation Corps determined whether expedited regular train service or special train service was necessary. The Association of American Railroads then made the arrangements and assigned special symbols. Reports on the progress of the shipments were received through the AAR, and final checks were made at the ports to determine whether the arrivals had been according to schedule.

The establishment of an Army consolidated car service was an innovation, but it was virtually a necessity. During the first year of the war about 40 percent of the total number of War Department shipments were less than carloads. As such they were routed by transportation officers in the field and were consolidated into carload lots by the railroads. These shipments therefore passed completely out of War Department control, and furthermore their delivery was delayed by the consolidating and break-bulk operations. After studying the situation the Army decided that by establishing its own consolidated car service for shipments between certain areas, it not only would overcome these handicaps but would effect a large saving in freight charges by paying carload rather than LCL rates.

The first Army consolidating station was established at Chicago in July 1942, for shipments to the State of California. The undertaking was so successful that additional consolidating stations were set up at New York, Philadelphia, St.

Trucks delivering package freight to the Army-Navy Consolidating Station at Chicago.

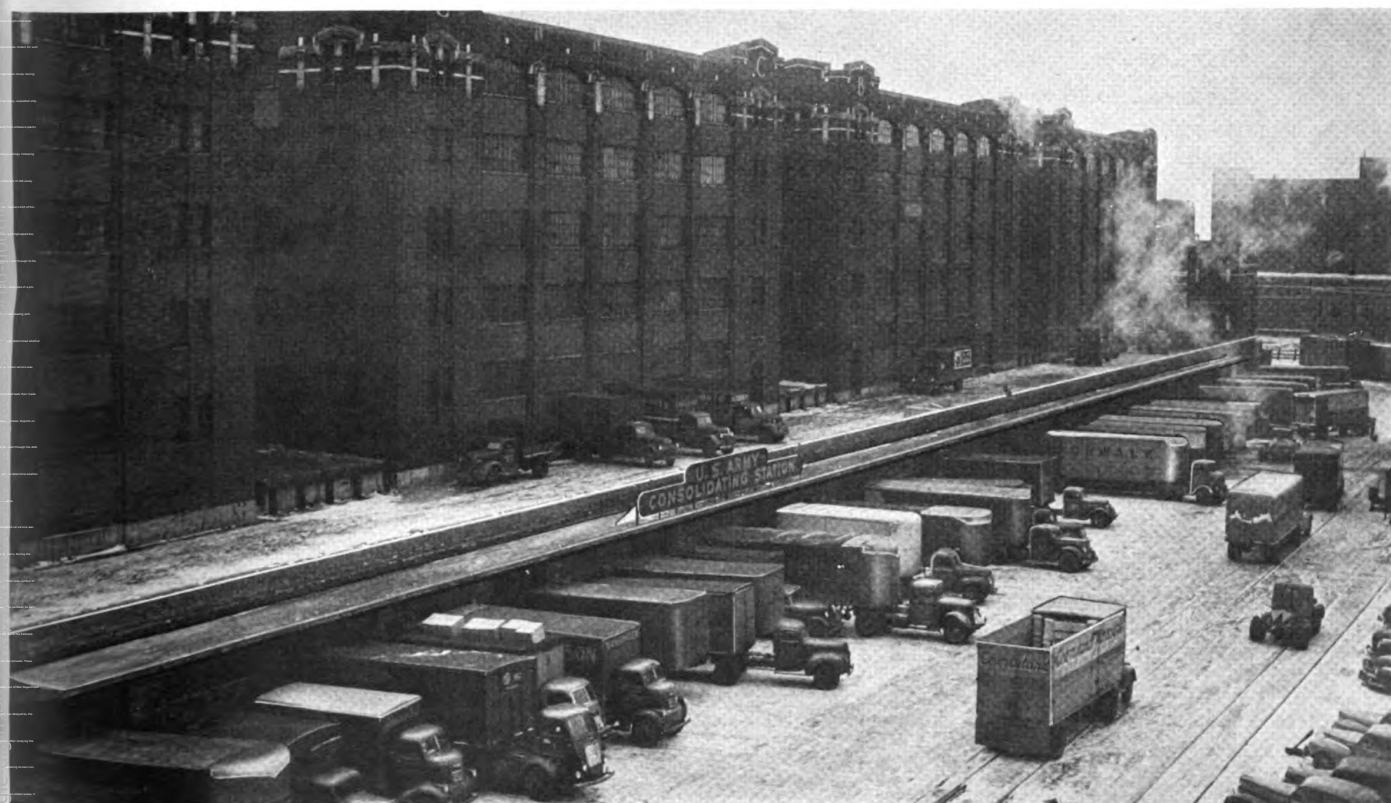
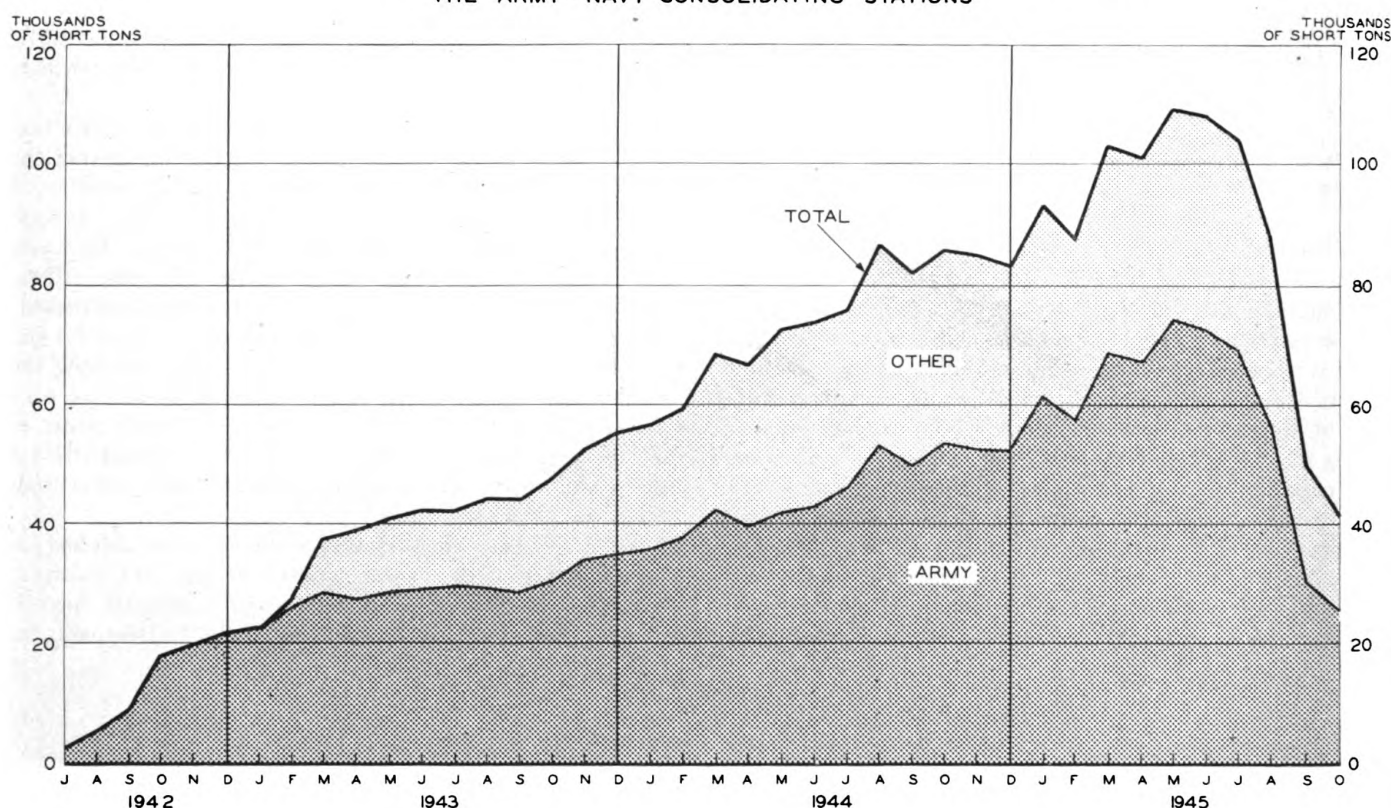


CHART NO. 5

SHORT TONS OF FREIGHT CONSOLIDATED AND FORWARDED MONTHLY BY
THE ARMY-NAVY CONSOLIDATING STATIONS



Louis, and Cleveland, and freight distributing agencies for their respective areas were installed at San Francisco, Oakland, Los Angeles, Portland, Tacoma, Seattle, Spokane, Ogden, El Paso, Fort Worth, San Antonio, Atlanta, Memphis, Chicago, and Philadelphia. Certain distributing agencies also did consolidating. When a full car could be consolidated for a single depot or other installation, it was consigned directly to that installation. In February 1943 the Navy began participating in the service, although the operation continued exclusively under the Army Chief of Transportation. From July 1942 through August 1945, a total of 140,000 carloads was consolidated, of which approximately 65 percent represented Army freight and 35 percent Navy freight. This total included 45,782 refrigerator cars which otherwise probably would have been deadheaded to the Pacific coast.

The strategy of defeating Germany before the full weight of our armed might was turned against Japan called for a complete plan for the readjustment of export traffic movements when VE-Day came. The planning was begun in August 1943 and every contingency had been provided for when Germany surrendered. Since October 1944 all shipments destined to Europe had been marked either SHP (ship) or STO (stop) before leaving the depot or contractor's plant. So far as

possible the two classes were shipped in separate cars. Upon notification from the War Department, it was a relatively simple matter for the railroads to hold STO cars, report them to the Office of the Chief of Transportation, and await notice of disposition. STO cargo at ports of embarkation and holding and reconsignment points also was to be reported to Washington by special courier. Representatives of the several procuring services were stationed in the Traffic Control Division to receive reports of stopped cargo and arrange for its disposition. This plan was placed in effect on 6 May, 2 days before official VE-Day, and by 10 May disposition orders had been furnished on all STO cargo, representing 7,112 carloads. A similar plan was used at the time of the Japanese capitulation, and the 15,396 carloads which were stopped by the railroads or reported by the ports were all disposed of by 7 September 1945.

Control of Port-Bound Freight

Having in mind the harmful effect of port congestion upon the movement of military supplies to France in 1917-18, the Army took steps early in 1941 looking to the control of its own traffic. The first measures were designed merely to keep the Office of The Quartermaster General fully informed regarding

export freight on hand at the Army ports of embarkation, and anticipated shipments to those installations. During the summer of that year, however, a system of release and routing was instituted, which applied to all War Department shipments of one carload or more destined to the ports, whether for the Army itself or for lend-lease. The release and routing orders were issued by the Transportation Division in the Office of The Quartermaster General, upon receipt of applications from the shippers, and after consideration had been given to actual conditions at the respective ports, and the amount of Army cargo recently released for shipment to the ports.

When the war broke upon us, all procuring agencies of the War Department were under heavy pressure to make deliveries at the ports with utmost speed, and large quantities of lend-lease supplies also were moving to the United Kingdom and Russia. Steps were taken to tighten the enforcement of Army control over its own shipments, but it was evident that control was necessary also over the substantial shipments of lend-lease supplies which the Treasury Department and the Department of Agriculture were making. At a meeting held on 11 December 1941, those departments agreed to recognize any requests which the War Department might make regarding the movement of their export shipments, with a view to avoiding congestion and keeping military supplies moving freely. While this expedient was helpful as a temporary measure, it did not

provide control at the source for shipments by Treasury and Agriculture, and it left commercial shipments entirely uncontrolled.

Up to the time of the establishment of the Office of Defense Transportation in December 1941, there had been no clear authority for the desired over-all control of port-bound traffic. The executive order which created ODT provided that authority, and directed ODT to utilize the facilities and services of existing departments and agencies so far as possible in exercising it. A series of discussions between representatives of the War Department, the Office of Defense Transportation, and the War Shipping Administration followed, in which the War Department insisted that over-all control be established without delay. The result was an informal agreement, approved 18 March 1942, which laid the foundation for the control system later developed. Several months were required to set up the necessary machinery and issue directions, and it was not until the summer of 1942 that the system was fully in operation.

Meantime a number of agencies which were of great value in the control operation had been instituted by the War Department. During the summer of 1941 it was decided to establish two holding and reconsignment points back of the North Atlantic ports to provide storage in transit for Army and lend-lease supplies which the ports were not prepared to handle immediately. Ten such installations eventually were built to support

**Floor of the Army-Navy Freight Distributing Agency at
Oakland, California.**





The Pasco Holding and Reconsignment Point as seen from the air.

Atlantic, Gulf, and Pacific ports. In the fall of 1941 the War Department established agencies at New York and Boston to represent the Army's interests in keeping lend-lease supplies moving smoothly through the ports, and the number of such agencies was increased as the need grew. Immediately following our entry into the war five regulating stations were set up on the transcontinental rail lines—at Spokane, Ogden, Salt Lake City, Albuquerque, and El Paso—to stop or divert cars destined to Pacific coast ports, as might be directed.

Due to lack of effective control over port-bound shipments, and other conditions growing out of our sudden entry into the war, the winter of 1941-42 brought the threat of serious congestion at a number of the large ports. This was notably true at New York, Philadelphia, and San Francisco. Among the contributing causes were the unusual volume of freight seeking export, the detention of some lend-lease shipments at the ports pending decision as to whether the supplies would be needed by the United States Army, the redistribution of shipping to

meet new requirements, and the temporary withdrawal of vessels from service for arming and degaussing.

The port of San Francisco was affected immediately. It was called upon to handle the bulk of the shipments to the Pacific by both the Army and the Navy, and the rail facilities were inadequate for the load. Furthermore, at the time of our entry into the war the Army maintained a general depot at San Francisco, which brought into the port area large quantities of supplies intended for issue to installations in the western states rather than for export. The situation was gradually cleared up by utilizing all available space for storage, moving cars out of the port area, and controlling further arrivals through the regulating stations. Eventually the general depot was removed from San Francisco. In dealing with this problem of congestion, the Army and the Association of American Railroads worked in close cooperation.

In an attempt to relieve New York of part of its heavy export traffic load, greater utilization of the port of Philadelphia was undertaken. Due primarily to the uncontrolled movement of lend-lease freight into Philadelphia, and the failure of ships to become available as promptly as had been anticipated, an unsatisfactory condition developed there. The backlog of freight held in cars, on the docks, and in storage became so great as to handicap current operations. In order that military cargoes might move freely through the port, the Chief of Transportation directed his representative in charge of the Philadelphia Port Agency to relieve the situation by whatever means might be found necessary. In addition to moving cars to sidings outside the port area, considerable quantities of freight were sent back to the Marietta Holding and Reconsignment Point for temporary storage, and further shipments to the port were restricted.

The system eventually established embraced a dual control, exercised through the issuance of block releases and unit permits. The block releases were issued by a Transportation Control Committee, consisting of representatives of the Army, Navy, Office of Defense Transportation, War Shipping Administration, and British Ministry of War Transport. The committee met daily in the Office of the Chief of Transportation, and its executive and staff were appointed by him. Based on estimates of the supplies which would be ready for export and the shipping that would be available for lifting them, the block releases indicated the maximum tonnage that could be shipped to each port during a given month. Having determined the block releases in advance of the month, the Transportation Control Committee was authorized to change the tonnages, require that specific shipments be held or diverted, and direct that embargoes be placed against specific ports, as subsequent developments might warrant.

The authority to issue unit permits for all Government export freight, except that of the Navy, was vested in the Traffic Control Division of the Office of the Chief of Transportation. Such permits were issued for specific shipments upon applications filed by the shippers. The Navy permitted its own shipments, and the War Shipping Administration was authorized to issue permits for commercial shipments, which it accomplished through the Association of American Railroads

acting as its agent. The sum total of unit permits for shipments to arrive at a given port during a given month could not exceed the pertinent block release. The railroads were directed not to accept shipments at points of origin unless unit permits had been issued to cover them. The War Shipping Administration introduced another safeguard by issuing forwarding authorizations for all lend-lease shipments, in order to synchronize the arrival of cargoes at the ports with the availability of ships to load them.

The Transportation Control Committee and the Traffic Control Division worked in closest harmony in order to insure that all possibilities of congestion at the ports or on the rail lines serving the ports were avoided. Daily detailed reports were received from the Army port agencies regarding carloads of freight in the ports "on wheels," carloads in port storage, the progress of the ships then loading, and cargoes en route to the seaboard. The railroads, through the Port Traffic Office of the AAR, also provided helpful analyses of carloads actually at the ports. The authority to control traffic was exercised not only to hold and divert shipments, but also to expedite those which were needed at the ports to complete ships then loading or to meet new military or lend-lease priorities.

Ceilings were established for each port, representing the maximum number of cars of export freight which could be held under load in the respective port areas without interference with operations. Summary reports showing the number of such cars actually on hand and other pertinent information were reviewed daily by the Chief of Transportation and his Director of Operations, and when the data indicated that there was danger of the bank of cars at a particular port becoming unduly large, appropriate steps were taken through the Transportation Control Committee and the Traffic Control Division to avoid such a development. Since the rail facilities at the Pacific coast ports originally were limited, compared with those at the large Atlantic coast ports, coordinated action was taken by the Army and the railroads to install additional trackage and provide additional equipment, to increase the capacity of those ports for handling the huge traffic which the war against Japan would create.

Table IV. Carloads of export freight covered by unit permits issued by the Office of the Chief of Transportation, July 1943 through September 1945

Period	War Department for Army	War Department Lend-Lease	Other Lend-Lease	Total carloads released
Monthly average:				
July-Dec. 1943 . . .	40,471	15,010	29,820	85,301
Jan.-June 1944 . . .	66,034	15,267	26,155	107,456
July-Dec. 1944 . . .	85,262	13,412	23,113	121,787
January 1945	113,893	13,221	26,586	153,700
February	94,694	9,384	21,667	125,745
March	113,904	9,088	24,944	147,936
April	100,121	11,709	22,876	134,706
May	92,418	7,332	24,963	124,713
June	86,207	6,647	26,667	119,521
July	85,400	8,300	21,300	115,000
August	66,500	3,600	22,000	92,100
September	34,500		10,000	44,500

One of the difficult problems with which the control system had to deal was the tendency to maintain large accumulations of lend-lease supplies at the ports, as a means of having on hand for immediate loading whatever items the receiving foreign governments might request. This was particularly serious so far as it resulted in a large number of cars being held at the ports under load. In the latter part of March 1944 the amount of export freight on wheels at New York was over 10,000 carloads. With the invasion of the Continent impending, and in order that the port might be ready to meet the requirements of the European Theater of Operations without any danger of congestion, the Army insisted that this bank of cars be reduced substantially. Appropriate actions by the Transportation Control Committee and the Traffic Control Division accomplished this result, and the bank averaged under 6,000 cars during the highly critical month of June. The same principle was applied to other Atlantic coast ports, though in not so drastic a manner.

Despite the unusually heavy movement of military supplies through the eastern ports during the Army's drive through France and into Germany, completely fluid traffic conditions were maintained at all times. The same was true at the western ports during the build-up of supplies at the Pacific bases in preparation for the final drive against Japan. In other words, the traffic control system completely fulfilled its highly important purpose. This accomplishment is the more noteworthy in view of the progressive increase in export freight handled at the ports because of the war. Data prepared by the Association of American Railroads indicate that as between the year 1940 and the early months of 1945, the average number of carloads of export freight (excluding coal, grain, and bulk liquids) unloaded daily at Atlantic coast ports increased from 1,300 to 3,410, while at Pacific coast ports the daily average increased from 203 to 1,847 carloads.

It is unfortunate that an effective over-all control system was not established until some time after we had entered the war. Had it been functioning earlier, the confusion of those early months would have been greatly reduced. Also, the fine accomplishment of the system should not conceal shortcomings. One inherent fault was that the issuance of unit permits was divided among three agencies—the Army, the Navy, and the War Shipping Administration. Obviously one issuing agency could have applied the control more uniformly. Another shortcoming was the paucity of information regarding Navy shipments, due to the lack of centralized traffic control in that department. Fortunately, this latter situation created a problem only at San Francisco, but it led to some uneasy moments in respect to that port.

Transit Storage Operations

The judicious utilization of transit storage was so important a factor in the control of port-bound traffic, that the facilities and methods employed for that purpose warrant some discussion. The facilities were of two kinds—holding and reconsignment points and railroad open storage yards. In planning them, the basic idea was that there should always be covered

and open storage space a short distance back from the ports, where supplies destined overseas could be held temporarily until the ports were ready to receive them. This arrangement would relieve the ports of the necessity of holding cargoes indefinitely pending the availability of shipping. It would place a varied store of supplies near the ports, which could be called forward and received within 24 hours, if an emergency need should arise. It also would provide a convenient place for the assembling of component parts and related items which should move overseas simultaneously.

The advantages of such facilities were recognized in the War Department early in 1941, when the scarcity of shipping began to be felt keenly. Following the passage of the Lend-Lease Act in March 1941, and the establishment of a large program of lend-lease shipments to the United Kingdom, the matter was considered urgent. The first step, taken in May, was the leasing of an industrial plant at Shamokin, Pennsylvania, for conversion into an intramodal depot. This plant soon was seen to be wholly inadequate in size, and not favorably located from the standpoint of rail connection with the eastern seaboard. Accordingly, in July it was decided to construct two entirely new facilities, one at Voorheesville, New York, on the New York Central System, and another at Marietta, Pennsylvania, on the Pennsylvania Railroad. The original conception was that each should have about 1,000,000 square feet of closed storage space and about 2,000,000 square feet of open storage space. To provide for expansion, if it should become necessary, sites of at least 500 acres were sought.

During the autumn of 1941, with Russia receiving lend-lease supplies and the danger of trouble in the Pacific steadily growing, recommendations were prepared for the construction of six additional holding and reconsignment points, one to back up our southern Atlantic ports, two the Gulf ports, and three the Pacific ports. Promptly following Pearl Harbor this program was approved. All were to have the same storage space as Marietta and Voorheesville, except one in the south, which

Table V. Holding and reconsignment points under the control of the Chief of Transportation in January 1944

Location of installation	Closed storage space (sq. ft.)	Open storage space (sq. ft.)	Acreage of site
Voorheesville, N. Y.	1,037,000	9,255,000	692
Elmira, N. Y.	1,499,000	6,029,000	677
Marietta, Pa.	1,440,000	5,662,000	506
Richmond, Va.	1,037,000	3,861,000	305
Montgomery, Ala.	1,042,000	4,025,000	865
Shreveport, La.	520,000	1,517,000	371
Yermo, Calif.	1,031,000	2,397,000	2,031
Lathrop, Calif.	1,522,000	4,677,000	720
Pasco, Wash.	1,038,000	3,871,000	745
Auburn, Wash.	1,498,000	1,500,000	598
Total	11,664,000	42,794,000	7,510

NOTE: The open space of the Voorheesville Holding and Reconsignment Point included 1,424,000 square feet of space located at Ravena, New York, which was leased and operated by the Point. After deducting space not available for actual storage, the total net usable space at the 10 holding and reconsignment points was 8,127,000 square feet closed, and 20,857,000 square feet open.

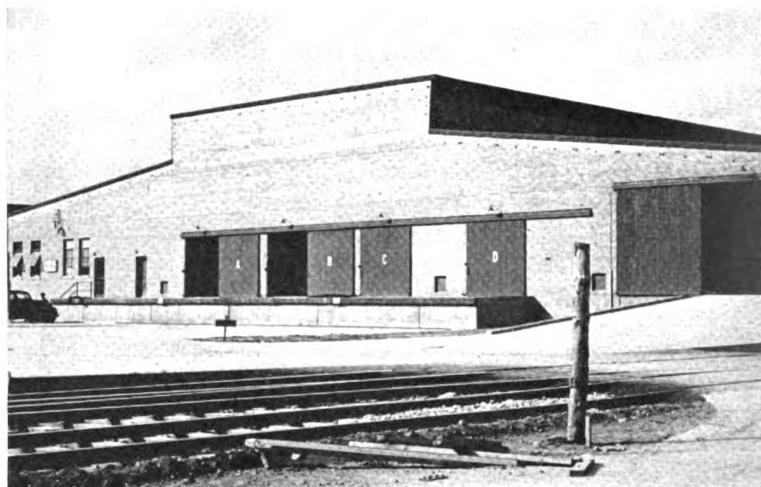
was to be half the size. In the spring of 1942 an additional installation in New York State was approved, and in the summer of 1943 yet another was authorized in the State of Washington, making ten in all.

Some shipments had been sent to open storage at Marietta prior to our entry into the war, and Voorheesville received its first freight in the early days of January 1942. The accumulation of cargo at the eastern ports necessitated the use of these intransit storage facilities as rapidly as their space became available. The first conception was that they would be utilized only for the storage of supplies procured by the War Department, whether for the United States Army or for lend-lease purposes. However, the volume of lend-lease supplies procured by the Treasury Department and the Department of Agriculture, which had arrived at or was en route to New York and other eastern ports during the early weeks of our belligerency, made it clear that if the holding and reconsignment points were to fulfill their mission in the prevention of port congestion, they would have to handle the shipments of those departments also. Agreements to this effect were soon reached.

In January 1944, with the last of the points nearing completion, they had total closed storage space of 11,664,000 square feet gross, and total open storage space of 42,794,000 square feet gross. Both closed and open capacities had been increased at certain points beyond the original conception. The warehouses were single story, approximately 180 feet by 960 feet. The open spaces actually used for storage were hard-surfaced. Beginning in February 1944, substantial amounts of space were diverted from the original purpose to accommodate Transportation Corps depots which were set up for the storage, processing, and issuing of the Corps' supplies and equipment. Eventually 7 of the 10 points had set aside space for this purpose. From time to time smaller amounts of space were allocated temporarily to other agencies, when not required for intransit storage purposes.

When the holding and reconsignment points were being planned, the Lend-Lease Administration agreed to share the expense, but expressed the desire that the installations be operated solely by the War Department. For several months after freight began arriving at Marietta and Voorheesville, operations were under the general supervision of the Supply Branch of G-4, and technical supervision was given by the Depot Division of the Office of The Quartermaster General. It was strongly argued, however, that since the function of the holding and reconsignment points was directly related to transportation, they should be operated by the transportation agency of the War Department. This view prevailed, and when a Chief of Transportation was created in March 1942, the commanders of the points were made responsible to him. He promptly established a Transit Storage Division in his office to supervise this activity.

A railroad open storage yard utilized by the Transportation Corps under contract.



Warehouses at the holding and reconsignment points were single-storied, with railway tracks serving full-length platforms and adequate provision for truck deliveries.



The open storage space at a holding and reconsignment point.



The plan was that the holding and reconsignment points should store only supplies which definitely were destined overseas. Basically these supplies fell into two broad categories: (A) those which were consigned to the ports but diverted to the points, pending the availability of ship space; (B) supplies shipped directly to the points to be held until required by an overseas theater, or by a foreign country under lend-lease. No supplies could be stored at the points until permits had been issued by the Office of the Chief of Transportation, and a consistent effort was made to keep at a minimum the amount of type B freight on hand, since it was the less likely to move out quickly. The general criterion was to turn over all shipments within 60 days, and the technical services or other agencies responsible for supplies remaining beyond that period were informed of the fact. While it was not practical or necessary to enforce this time limit strictly, it was enforced to the extent required to insure that sufficient free space was available at all times to afford the ports the necessary protection.

A fairly typical analysis of space occupancy at the holding and reconsignment points during the latter stages of the war was that made as of 27 December 1944. On that date the Government procuring agencies had 30,566 carloads of freight in storage, which represented 41 percent of the available working space; there were advance bookings for 10,041 additional carloads, equalling 13 percent of the space; the 46 percent of the space which was unoccupied and uncommitted represented storage for 34,332 carloads. The Transportation Corps had the unusually large amount of 10,547 carloads on hand, mostly at the eastern points where it was being held pending shipment to the European Theater of Operations.

Every effort was made to insure that no encroachments were permitted upon the space available at the holding and reconsignment points which would prevent the installations from fulfilling their appointed mission. A careful reporting system was developed, which gave a day-to-day realistic picture of the situation at each installation and provided a basis for authorizing additional shipments to them. Although the nature of their mission laid them open to peaks and valleys of traffic, by the judicious issuance of permits it was possible to maintain a fairly even flow and thus avoid excessive demurrage and overtime labor charges.

Table VI. Freight on hand at the ten holding and reconsignment points on 27 December 1944, classified according to procuring agencies

Agency	Carloads in closed storage	Carloads in open storage	Total carloads	Percent of total
Corps of Engineers.....	876	789	1,665	5.4
Quartermaster Corps.....	1,168	166	1,334	4.4
Signal Corps.....	174	96	270	.9
Medical Corps.....	790	35	825	2.7
Chemical Warfare Service.....	153	55	208	.7
Ordnance Department.....	1,149	2,336	3,485	11.4
Transportation Corps.....	2,000	8,547	10,547	34.5
Treasury Department.....	4,303	3,073	7,376	24.1
War Food Administration.....	347		347	1.1
Miscellaneous.....	522	3,987	4,509	14.8
Total.....	11,482	19,084	30,566	100.0

The Office of the Chief of Transportation saw to it that the best warehousing techniques were employed, and that both personnel and equipment were efficiently utilized at the holding and reconsignment points. Between October 1943 and July 1945 the average tons handled per man-day by the freight handlers increased from 10.5 to 20.7, and the average tons handled per man-day by the storage division increased from 6.0 to 11.2.

Since sites for the holding and reconsignment points were chosen with a view to avoiding congested areas, so that traffic in and out always could move freely, they were located near small communities and in some cases in isolated areas. This necessitated supplying Government housing at certain points for civil service labor. At five installations contract labor was utilized. The price per ton basis enabled the contractor to import workmen from more advantageous labor markets. By careful supervision of operations, and close study of terms when the contracts came up for renewal, efficient and low cost service was obtained.

In the beginning, each procuring agency which utilized the holding and reconsignment points had representatives stationed there to supervise the handling of its supplies. This resulted in a lack of uniformity in methods of operation, and the attempt to maintain detailed property accountability retarded the handling of traffic. In 1943 this system was discontinued. All such personnel then became responsible directly to the Transportation Corps officers in command of the installations, and accountability was placed on a simple carload basis. The results were greater orderliness in the functioning of the installations and a saving of manpower.

Aside from serving as reservoirs for regulating the day-to-day flow of freight to the ports, the holding and reconsignment points were utilized to protect the ports on many special occasions. In April 1944, for example, because the number of ships assigned to load supplies for the European Theater of Operations had been reduced temporarily, 1,500 carloads of supplies which had been released for shipment to the ports were sent to holding and reconsignment points. In October 1944, when the backlog of ships awaiting discharge in the European Theater necessitated a reduction of loadings at United States ports, more than 1,000 carloads of freight were ordered into holding and reconsignment points. In April 1945, in anticipation of the collapse of Germany, action on requisitions for certain supplies was suspended by the theater and about 600 carloads were sent to holding and reconsignment points to await disposition. During 1944 and 1945, more than 5,000 carloads of Army freight alone were shipped back from Atlantic coast ports to holding and reconsignment points, or diverted en route, at the request of the Army port commanders.

Similar diversions of lend-lease freight were made frequently, though not in such great quantities. During 1944 and 1945 a considerable part of the supplies exported to Russia was shipped from Pacific coast ports, particularly Portland. Because of the uncertainty of the arrival of Russian vessels to load these cargoes, and also the fact that railway and storage facilities at the ports were fully occupied with military and

other traffic, it often was necessary to divert Russian lend-lease shipments to holding and reconsignment points. A rather unique operation involved 800 carloads of wool destined to Russia. This wool was brought from Australia by American vessels and discharged at Pacific coast ports for transshipment. Since the freight could not be accommodated at the ports without handicapping their other operations, it was sent to the Pasco Holding and Reconsignment Point for temporary storage.

The railroad open storage yards served the same general purpose as the holding and reconsignment points, and supplemented those installations. However, they were owned by the railroads, and operated by them under contract with the Army. The allocation of space was controlled by the Office of the Chief of Transportation, and it was responsible also for inspection of the yards to determine that proper operating techniques were being employed, and adequate guarding and fire protection provided. There were 48 such yards at the disposal of the Army, all but one of them situated east of the Mississippi River. At no time were all of them in active status, the number varying according to requirements, but usually being above 40.

The Transit Storage Division in the Office of the Chief of Transportation was responsible for technical supervision of the operation of the holding and reconsignment points and the railroad open storage yards, and controlled the utilization of the storage space. A part of the responsibility for supervision was delegated to the zone transportation officers in whose territories the installations were situated.

From the beginning of operation to VJ-Day the holding and reconsignment points received and stored approximately 300,000 carloads of Army and lend-lease supplies. During the same period the railroad open storage yards received and stored approximately 100,000 carloads.

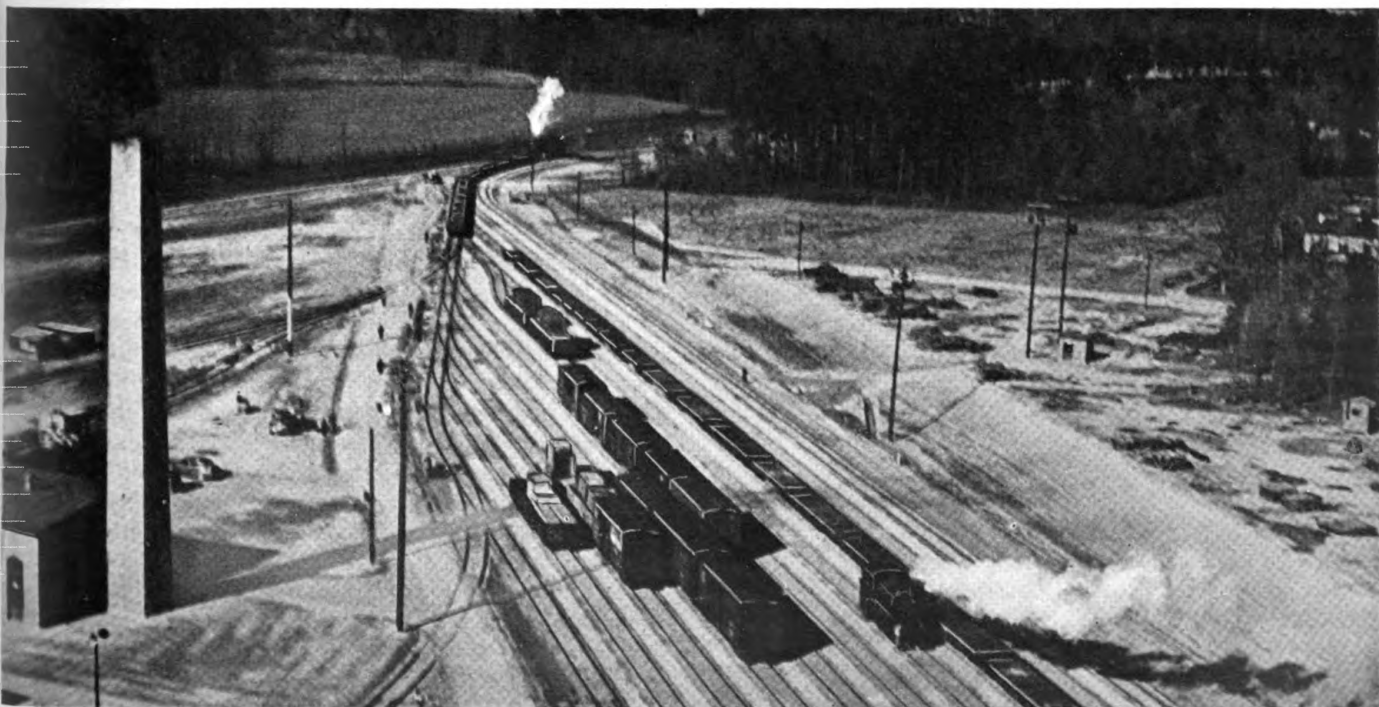
Utility Railroads

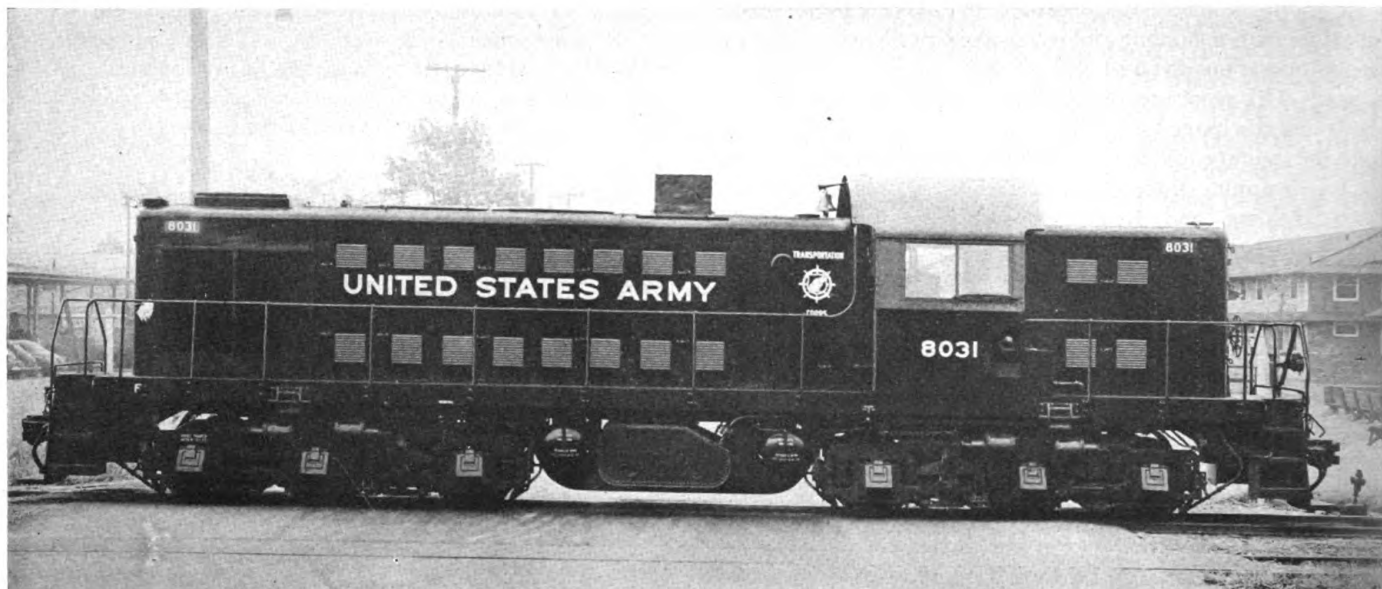
From November 1942, the Transportation Corps was responsible for the design, procurement, and assignment of the railway equipment required by utility railways at Army posts, camps, and stations in the zone of interior. Such railways were in operation at 365 installations on 30 June 1945, and the following Army-owned equipment was assigned to them:

Locomotives	1,476 units
Auto railers	85 units
Locomotive cranes	322 units
Cars of all types	8,274 units
Maintenance of way	759 units
Total	10,916 units

The Transportation Corps was responsible also for the operation and maintenance of utility railway equipment, except where it was assigned to installations pertaining exclusively to another service. In the latter instance, general supervision was given, and the Transportation Corps' trainmasters and master mechanics rendered technical service upon request. Checks were made to ascertain whether the equipment was being efficiently employed and effectively maintained. Short-

Utility railroad layout at an Army installation.





Type of locomotive used extensively for switching on Army utility railroads.

comings were analyzed and remedial measures prescribed. Methods of reducing crews were developed, with resulting conservation of labor. Where assigned equipment was in excess of needs, transfers were effected. These activities were carried on under the direct control of the zone transportation officers, and under the general direction of the Rail Division in the Office of the Chief of Transportation.

The Army's railroad repair shops were operated by the Transportation Corps after 1 May 1944. Prior to that time the shops were operated by the commanders of the installations to which they were attached. Initially the Transportation Corps assumed control of three such shops—at Holabird Signal Depot, Maryland; Ogden Arsenal, Utah; and Fort Benning, Georgia. On 1 June 1944, a shop of the New York Central Railroad at Bucyrus, Ohio, which had been used as a training facility for military railway troops under control of the Fifth Service Command, was transferred to the Transportation Corps for use as a railroad repair shop, and also for training purposes. The Transportation Corps decided whether repairs, not performable at the installations to which the equipment was assigned, should be obtained commercially or be effected at one of its own repair shops. The Transportation Corps shops performed 239 repair jobs during the 12 months ending 30 June 1945.

The lay-out of trackage at Army installations, and the establishment of switching connections with common carrier lines, were given careful supervision by Transportation Corps technicians, so far as the opportunity was afforded. Unfortunately, the larger part of the Army's new installations had been completed, or at least placed under construction, before the Transportation Corps came into existence. In those early days of the emergency, sites sometimes were chosen and track-

age laid out without due consideration of operating efficiency and economy. This oversight can be attributed in part to the haste with which the projects were planned, but it also was due in part to the absence of a permanent Transportation Corps to which other elements of the Army naturally would turn for advice in such matters.

The 320 hospital ward cars and 60 hospital kitchen cars which the War Department owns and operates in the zone of interior, are not strictly speaking utility railway equipment, but it is convenient to refer to them under that heading. The Rail Division of the Office of the Chief of Transportation collaborated with the Office of The Surgeon General in the design of this equipment. The cars were assigned to the service commands in which were located the ports where sick and wounded soldiers from overseas were landed. The service commands therefore had primary responsibility for their operation and maintenance. However, the Rail Division exercised technical supervision over their maintenance as railway rolling stock, and represented the War Department in all operating arrangements made with the Association of American Railroads.

It is convenient to mention here, also, that at the end of the war the Army owned approximately 4,000 tank cars which it employed for the transportation of petroleum products to installations where large quantities of gasoline and oil were used, and other liquids to ordnance and chemical manufacturing plants. The Army undertook the ownership of these cars because most such equipment is not owned by the common carrier railroads, but by other private concerns. Maintenance and repairs were effected commercially. Their operation was under the management of the Traffic Control Division of the Office of the Chief of Transportation.

Administrative Motor Vehicles

Because of the enforced curtailment in the use of private automobiles, and the inability of the common carriers to increase their services on account of restrictions on new equipment, local transportation shortages became acute in many communities during the first year of the war. The War Department was seriously affected by the difficulty which workers experienced in obtaining transportation between their homes and the factories where war matériel was being manufactured. The situation became difficult also in the vicinity of Army installations, many of which were considerable distances from urban communities.

Congress acted to relieve this situation by the passage of Public Law 779, 77th Congress, which was approved 1 December 1942. Under this law the War Department and other Federal agencies were authorized to provide transportation for the use of war workers between their homes and places of employment, after a determination by the Office of Defense Transportation that existing facilities could not be rendered adequate by other means. The Office of Defense Transportation also opened the way for the War Department to provide service in the vicinity of Army installations with Army-owned equipment. Prompt steps were taken to build up a fleet of buses for these purposes. The procurement and management of this fleet were made a responsibility of the Highway Division in the Office of the Chief of Transportation.

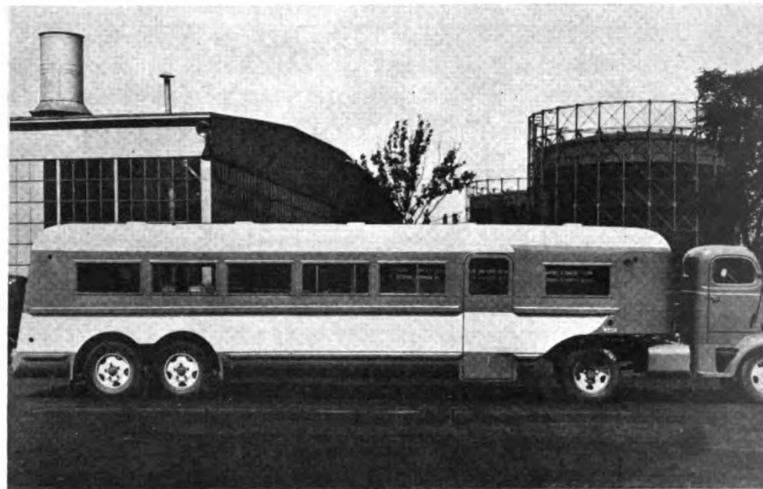
The procurement of buses was a problem in itself, because of the prevailing shortage and the restrictions on the use of strategic materials in the production of new vehicles. Many old vehicles were acquired and converted, including a large number of the auto-haulers which in peacetime transported automobiles on two decks. New designs were developed to meet a variety of operating conditions, which called for a minimum of scarce materials. By 30 June 1945 a pool of 7,498 vehicles had been assembled for this purpose. On that date, 1,599 buses were allocated for service in industrial communities, 5,536 were being employed at Army installations, and 363 were in a reserve pool which was maintained to meet emergency calls, or were under repair.

The pool buses were assigned for operation under contract to private individuals or concerns, or for direct Army operation. Proposals for such services were investigated by the Highway Division, and if the circumstances appeared to warrant an allocation of vehicles, authorization of the Office of Defense Transportation was obtained. Care was taken to insure that the operators used the equipment only on the authorized routes, and that the fares charged were in harmony with other local fares. A constant check on these matters, as well as the contractors' operating and maintenance standards, was maintained through the highway officers in the transportation zones.

By providing adequate service with Army-owned equipment the problem of absenteeism and rapid turnover among war workers was eased in many communities. War plants frequently were located far from population centers, and the reasonable fares fixed for the Army-sponsored services were a factor in inducing workers to accept employment at such plants.

In at least one instance a threatened strike was averted by the promise of improved service to the plant.

At the close of hostilities there were about 115,000 administrative vehicles, other than pool buses, assigned to Army Ground Forces and Army Service Forces installations. Until the late months of the war these vehicles were allocated by ASF headquarters in accordance with requests received. In order to keep the total number of vehicles in service within reasonable limits, horizontal cuts were made from time to time. Such cuts were acceptable where there was an oversupply of vehicles, but worked a hardship where an effort had been made to enforce economy. In May 1945 responsibility for the allocation of administrative vehicles on behalf of the Army Service Forces was placed upon the Chief of Transportation and delegated by him to the Highway Division.

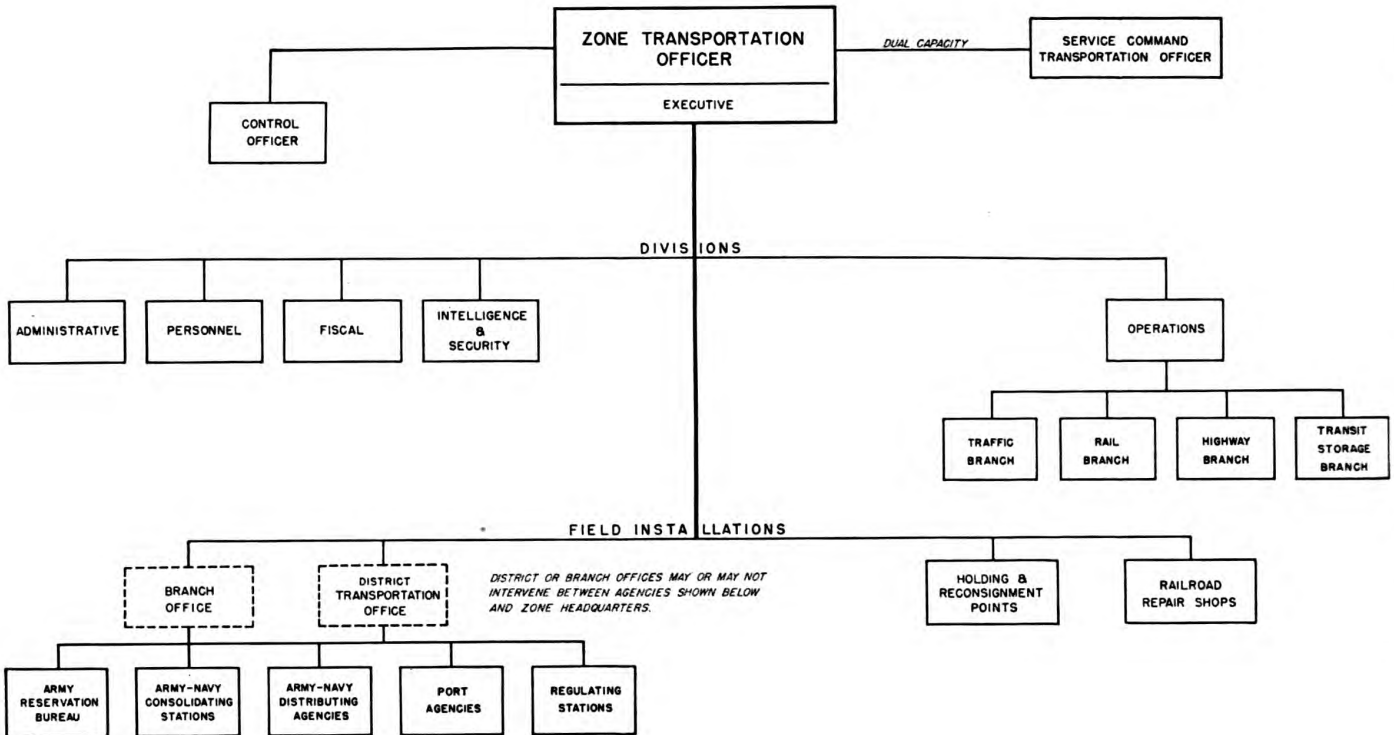


Prewar autohauler converted into a large-capacity bus for the Transportation Corps pool.

New pool bus designed to utilize a minimum of scarce materials.



CHART NO. 6
ZONE TRANSPORTATION OFFICE
TYPICAL ORGANIZATION
1 JULY 1945



Vehicles were allocated to the service commands for distribution to Class I, II, and IV installations, and direct allocations were made to War Department contractor-operated installations and construction projects. In the latter case survey teams made up in the transportation zones were used to investigate the installations in order to establish requirements accurately. The service commands surveyed Class I, II, and IV installations, and the survey reports, which frequently were made by transportation zone personnel, were taken into consideration in acting upon the service commands' quarterly applications for vehicles. When a service commander and an installation commander were unable to agree as to the latter's requirements, a Transportation Corps survey team was sent to the installation to resolve the difference. This careful scrutiny of requirements accomplished a considerable saving in vehicles, gasoline, and manpower.

In view of the extreme secrecy surrounding the Manhattan Engineer District during the development of the atomic bomb, the Highway Division handled directly all matters relating to administrative vehicles for the numerous installations connected with that project, in order to keep to a minimum the number of persons having contact with those installations.

Army Transportation Zones

Before the emergency it was feasible to leave the details of inland transportation to the shippers and the carriers, with the War Department exercising only a general supervision to establish policies and harmonize practices. There was no urgency about the shipments and no danger of congestion at large traffic centers. The war, however, introduced a new set of circumstances. Not only were traffic conditions much more difficult to cope with, but new and complicated procedures were required to meet war conditions, and it became necessary for the War Department to assume many additional functions relating to transportation and traffic.

These additional responsibilities led to the establishment of a variety of field agencies, scattered throughout the country. Such agencies originally were supervised by the operating divisions in the Office of the Chief of Transportation, which were responsible for the respective activities—railway transportation, highway transportation, traffic control, procurement and transit storage. This was a natural development under the circumstances, but it led to some overlapping and lack of coordination, and it placed upon the divisions at headquarters a

heavy burden of administration. As a result, in December 1942 nine transportation zones were established, covering the entire United States, and the zone transportation officers were made responsible for the direct supervision of the Transportation Corps installations and activities in their respective areas, except those controlled by the commanders of the ports of embarkation. This development represented a decentralization of responsibility from the Office of the Chief of Transportation, and a centralization of responsibility within the zones.

The zone transportation officers thus became the field representatives of the Chief of Transportation. After adjustments had been made to fully coordinate activities and eliminate unnecessary installations, the zone transportation officers were responsible in their respective areas for holding and recon-
signment points, regulating stations, consolidating stations, distributing agencies, railway repair shops, reservation bureaus, and the port agencies which dealt with lend-lease traffic. The zone transportation officers also established district transportation offices and branch zone offices at important points to supervise activities in the respective localities.

Care was taken to differentiate between the responsibilities of the new zone transportation officers in connection with the operations which had passed under their supervision, and the responsibilities of the operating divisions at headquarters, which previously had provided such supervision. The divisions were restricted to technical supervision and to such further control as might be specifically assigned to them. It was the intention of the Chief of Transportation that the responsibilities of the zone transportation officers should be clear and unimpaired.

The transportation zones were coextensive with the service commands and their headquarters were in the same cities. Thorough coordination of the two agencies obviously was most essential. To this end it was provided, soon after the establishment of the zones, that the zone transportation officers should serve as the transportation officers on the staffs of the service commanders. This arrangement was carried out promptly by certain service commands, and eventually by all of them. There was for a time a feeling in some quarters that all field activities of the Transportation Corps should be under the service commands. However, the highly technical nature of the transportation zone activities, the fact that many of

Troops and their organizational equipment sometimes moved in the same train, and sometimes separately.



those activities were on a nation-wide basis which transcended service command boundaries, and the necessity for closest coordination between the zones and the ports of embarkation, argued strongly and effectually for maintaining the zones where they had been developed—under the authority of the Chief of Transportation.

The zone transportation officer undertook to aid the shipping officers at Army installations and contractors' plants in all the details of their work, with a view to eliminating errors of procedure and improving the utilization of equipment. His ability to do this at Army installations other than those under the Chief of Transportation, was limited because of the nature of the relationships. As transportation officer of the service command, he had staff supervision of transportation matters at Class I and II installations, subject to the policies of the service commander. He had no authoritative basis of action at Class III (Army Air Forces) installations. The same was true at Class IV installations under other technical services until almost the end of the war, when such installations were placed in the same relationship as those of Class I and II. As a result of this situation, it was practically impossible to work out a completely coordinated transportation program in the field. Experience indicates that the Chief of Transportation, through his field representatives, should have authority for technical supervision at all Army installations in the zone of interior, in all matters of transportation and traffic for which he has general responsibility under Army regulations. This view applies also to the maintenance and operation of utility railroads.

The zone transportation officers were responsible for the smooth flow of War Department traffic in their respective areas, and for expediting specific shipments when necessary. This involved keeping a close watch over general traffic conditions, taking timely steps to clear away threats of congestion and aiding the carriers in keeping their services in full operation.

Aid to the carriers included assistance in dealing with the many aspects of the manpower problem. In the case of the motor carriers, assistance was given in obtaining new equipment, spare parts and tires, and also in overcoming the difficulties imposed by the varying state laws regarding the sizes and weights of vehicles permitted to use their highways. Needs for highway improvements and extensions were studied in the light of Army traffic requirements, and representations were made to state highway authorities for appropriate action. The zone offices were staffed with experts to handle all phases of transportation.

During the greater part of the war each zone office included a supply division which was charged with supervision of the manufacture and delivery of all equipment and supplies produced in its particular area under Transportation Corps contracts. This responsibility included investigation of the ability of new contractors, enforcement of specifications, expediting delivery, and acceptance of the finished product. Eventually, in April 1945, it became expedient to concentrate the supply activities of the nine zones in four new procurement offices, which were responsible directly to the Procurement Division in the Office of the Chief of Transportation.

The zone offices were responsible for dealing with industrial disputes which would affect the movement of War Department shipments or the production of Transportation Corps supplies. The zone officer's first task was to keep fully informed regarding developments or prospective developments in this field and report them to the Office of the Chief of Transportation. In emergency matters he acted on his own initiative, but otherwise he was guided by instructions from headquarters. By persuasion, and with the aid of agencies authorized to deal with such matters, he endeavored to forestall strikes when possible, and to bring about a quick settlement when work stoppages actually occurred.

In the gathering dusk a convoy prepares to sail from an American port.

OCEAN TRANSPORTATION

The movement of troops and cargo to and from oversea destinations was a tremendous operation. At its peak in July 1945 the ocean-going fleet in Army service totaled 1,706 vessels aggregating about 15,940,000 deadweight tons, of which 261 were classified as troop or hospital ships and 1,445 as cargo ships. In addition, troops and military supplies were shipped on vessels under the control of the Navy.

To keep so many vessels fully employed on routes reaching to all parts of the globe, and to obtain the greatest possible amount of transportation service from them, required a large staff of shipping experts, huge port installations for the handling of ships, passengers, and cargo, and a complete system of intelligence and control. The utmost care had to be employed to insure that all phases of each operation were thoroughly coordinated in the planning stage, and executed with the best results possible under the circumstances.

An inevitable and considerable handicap was that imposed by the necessity of sailing ships in convoys. In the Atlantic, all but a few of the fastest vessels moved in convoys under naval escort. The fast convoys, with ships expected to maintain a minimum speed of 14 knots, included mostly troop ships but also some of the speedier freighters and tankers. The slow

convoys, which ranged in speed from 8 to 10 knots, included mostly cargo ships but also some of the slower troop ships. A few convoys were set up for intermediate speeds. The fast groups might include up to 40 vessels, and some slow groups exceeded 100 vessels not counting the escorts. Ships of 20 knot speed were routed independently since they could outrun a surfaced submarine. In the Pacific, where the submarine menace was not so great and there was a better chance for diversified routings, a large proportion of the ships moved independently, convoys being restricted to the more heavily traveled routes and to advance areas. The frequency and departure times of convoys were agreed between the Army and the Navy. Routings were determined solely by the Navy.

The effect of the convoy system was to slow down operations and introduce numerous difficulties. Many vessels were required to proceed at less than full speed while at sea. Time was lost while ships were awaiting discharge berths or awaiting the sailing of the convoy to which they were assigned. Port operations had to be geared to handle large numbers of vessels at one time, rather than an even flow. A strain was put on the facilities for fueling, storing, and repairing the ships. The loading or discharging of large items of cargo might be



Table VII. Ship casualties in World War II involving loss of 50 or more American soldiers, not including casualties during amphibious assault operations

Vessel	Flag	Date	Area	U. S. military personnel lost
DORCHESTER	American	3 Feb 43	Greenland	404
HENRY R. MALLORY	American	7 Feb 43	Greenland	86
CAPE SAN JUAN	American	11 Nov 43	Fiji Islands	114
ROHNA	British	26 Nov 43	Algeria	1,015
WILLIAM B. WOODS	American	9 Mar 44	Sicily	51
PAUL HAMILTON	American	20 Apr 44	Algeria	504
LST 531	American	28 Apr 44	English Channel	314
LST 507	American	28 Apr 44	English Channel	126
H. G. BLASDEL	American	29 Jun 44	English Channel	76
MATTHEW P. DEADY	American	3 Nov 44	Philippines	61
THOMAS NELSON	American	12 Nov 44	Philippines	139
JEREMIAH M. DAILY	American	12 Nov 44	Philippines	80
MARCUS DALY	American	5 Dec 44	Philippines	62
LEOPOLDVILLE	Belgian	24 Dec 44	English Channel	764
WAR HAWK	American	7 Jan 45	Philippines	57
KYLE V. JOHNSON	American	12 Jan 45	Philippines	109
SERPENS	American	29 Jan 45	Guadalcanal	58
LST 577	American	11 Feb 45	New Guinea	86
J. W. McANDREW	American	13 Mar 45	Azores	68

delayed by the lack of sufficient heavy lift equipment to serve all ships. Particularly at oversea ports, labor might be inadequate for the full working of all hatches.

On the other hand, the effectiveness of the convoy system, after adequate escort vessels and air protection had been provided, was beyond question. The Army's losses from enemy action were relatively light. Leaving aside losses sustained during amphibious assault operations, 4,612 American soldiers were lost on 79 vessels sunk or damaged, and 737,704 measurement tons of Army cargo were lost on 148 vessels sunk or damaged. The troop loss constituted only 0.063 percent of the total outbound passenger traffic, and the cargo loss only 0.58 percent of the total outbound cargo traffic. Of the totals, 3,604 men and 537,566 measurement tons of cargo were lost in the Atlantic and adjacent waters. The heaviest loss of life was in the sinking of the British troop ship ROHNA, which was destroyed by enemy air attack off the coast of Algeria in November 1943. Of the total of 1,981 American military personnel on board that vessel, 1,015 were lost.

Outward Troop Traffic

During the 45-month period, December 1941 through August 1945, the Transportation Corps embarked 7,293,354 passengers for oversea destinations. Of these, 6,902,717 (over 94 percent) were Army personnel. The remainder consisted of Navy and Allied military personnel, civilians and prisoners of war. Civilians traveling in the national interest, and approved by the State Department, were accommodated on troop transports when space could be spared from strictly military uses.

Total embarkations showed a general upward trend until the late months of the war, as the total troop lift was increased by the addition of new vessels and the conversion of old ones. The embarkation figures varied considerably from month to month, due in part to the spacing of convoys and in part to

changing strategical requirements, which called for exceptional efforts to place more troops in a particular theater during a specific period, or a permanent shift of emphasis from one theater to another. Thus there were unusually heavy outward movements during the months before and just after the invasion of France, and as a result of the German counteroffensive in December 1944 and January 1945. During the spring of 1945, when the fighting in Europe was drawing to a close and measures were being taken to increase the flow of troops to the Pacific, the total embarkations declined in a pronounced manner.

Because of the wide distribution of our forces and the changing designations applied to certain theaters, a wholly satisfactory analysis of oversea troop traffic by destinations is difficult to present. However, the following break-down of embarkations at United States ports (officers and enlisted men only) during the 45 war months, is sufficiently indicative:

Area of destination	U. S. troops embarked
Atlantic:	
North and South America	167,851
Africa, Mediterranean, and Middle East	1,036,137
United Kingdom and Continent	3,273,418
Total Atlantic	4,477,406
Pacific:	
North America	205,581
Central and South Pacific	965,145
Southwest Pacific	1,007,118
Asia	247,467
Total Pacific	2,425,311
Grand total	6,902,717

Oversea troop movements, starting from home stations in the zone of interior and ending at the discharge ports in the theaters, required a vast amount of coordination to make the various stages of the journey mesh perfectly, and to insure that the troops and their equipment arrived overseas according to plan. Over-all coordinating responsibility rested with the

Movements Division in the Office of the Chief of Transportation. It worked with the Operations Division of the War Department General Staff and the Mobilization Division of the Army Service Forces to make sure that movements were planned and orders written in accordance with the capabilities of the available troop ships. It worked with other elements of the Transportation Corps to make certain that the transportation of the men and their equipment to the ports was properly executed, and that the complex machinery of the Army ports of embarkation was geared to handle the load.

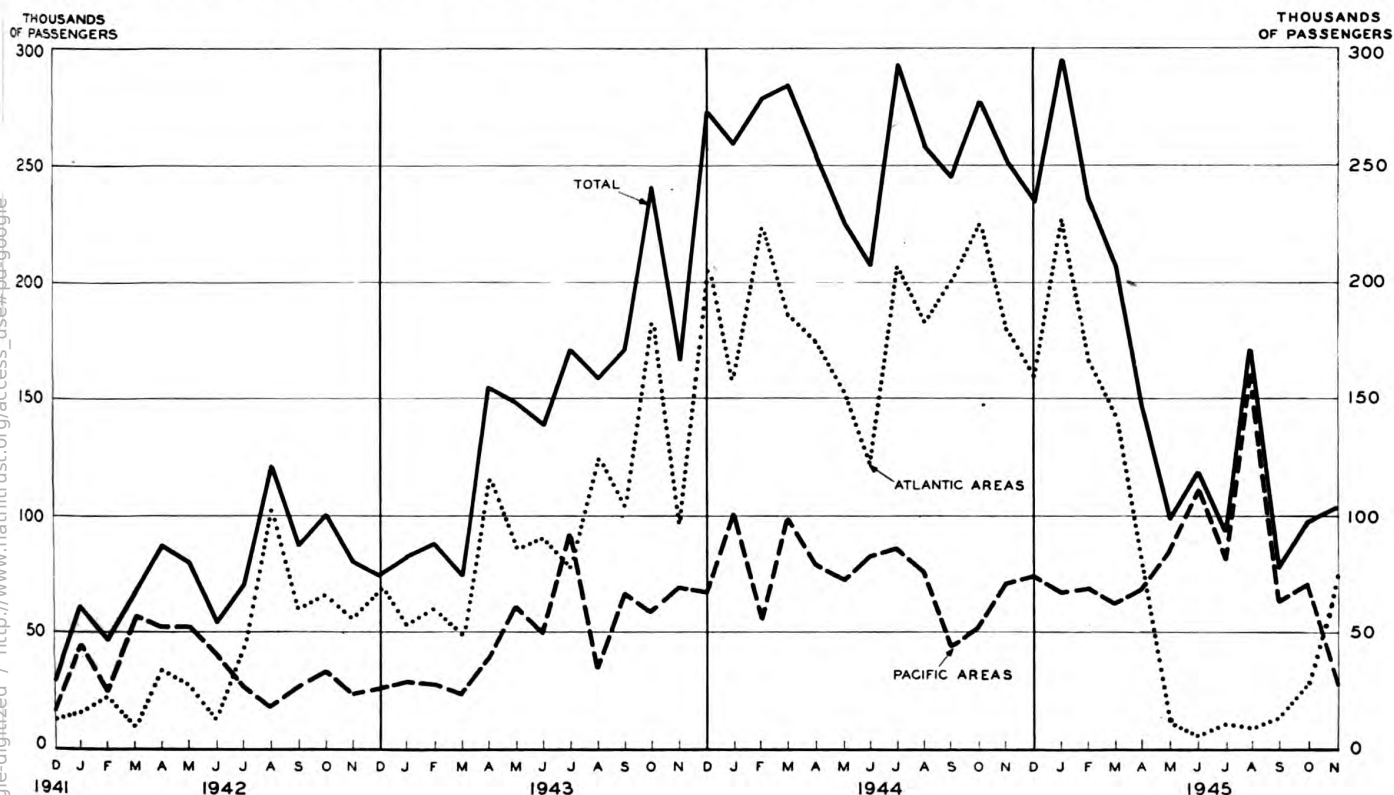
The problems differed according to the types of troops moving. Units, because of their organizational equipment, and because of the fact that both personnel and equipment often required extensive processing at the ports, placed the greatest responsibility upon the Transportation Corps. The heavy movement of divisions to Europe, which took place during the last half of 1944, put the machinery to the supreme test. During the early part of 1945, when the demand from Europe was for replacements to keep the units on hand at full strength, rather than for additional units, the troop movement problem was considerably eased, for those troops carried only individual equipment, and they had been so well screened at the replacement depots that they required little attention at the port staging areas. The traffic resulting from the policy of rotating troops who had seen long service in active theaters, was in the same category as replacements.

The handling of organizational equipment was a matter of continual study and experimentation. It was desirable that this equipment be in the theater by the time the units themselves arrived. The conventional way of meeting this requirement was to have the equipment move overseas in the same convoys with the troops. Since the equipment came from various origins—the units' home stations, technical service depots, and manufacturers—bringing it to the port at the proper time and stowing it in ships in the manner that would make it most readily available on arrival overseas was a complicated task. This can be readily understood in the light of the fact that during the period August 1944 through February 1945, a total of 36 divisions, including nine armored and two airborne divisions, was sent to Europe. The personnel of these divisions moved in 126 troop ships, and their organizational equipment was sufficient to fill 266 LIBERTY ships. Naturally, many smaller units as well as replacements moved during the same period.

Two new methods of dealing with this problem were introduced during the war, and both were comparatively successful. During the build-up of United States forces in the United Kingdom, large quantities of organizational equipment were shipped in advance of the troops. This eased the problem of coordinating the movements to the ports of embarkation, and it enabled equipment to be assigned to the units promptly upon their arrival at destination, ready for service. This plan, which

CHART NO. 7

PASSENGERS EMBARKED MONTHLY BY THE ARMY AT UNITED STATES PORTS FOR OVERSEAS DESTINATIONS



presupposed the existence of well-organized bases for the handling of the equipment after its arrival overseas, was utilized for other theaters also. After the invasion of the Continent, the War Department directed that from D plus 90 all units destined to the European Theater of Operations leave the United States fully equipped and convoy-loaded. To meet this requirement, and to lighten the burden on the ports of embarkation at New York and Boston as much as possible, an equipment staging area was set up in the Elmira Holding and Reconsignment Point to receive and sort the matériel, and hold it until it was called for by the ports.

In the beginning, many complaints were received from the theaters because trucks, tanks, and other automotive equipment, particularly that shipped on deck, had arrived in poor condition. Sometimes the mechanism obviously had not been in good order at the time of shipment. Frequently it had suffered from corrosion caused by salt water and salt air. To meet this situation the ports of embarkation established processing plants where unboxed equipment was inspected before it was forwarded to the loading piers, motors drained and cleaned, repairs made when necessary, spare parts replaced if found missing, and all openings and crevices sealed with sealing compound and tape. The situation was especially acute in the Pacific in 1942, because the discharge ports did not have adequate repair or assembly facilities. Consequently, the vehicle processing plant of the San Francisco Port of Embarkation,

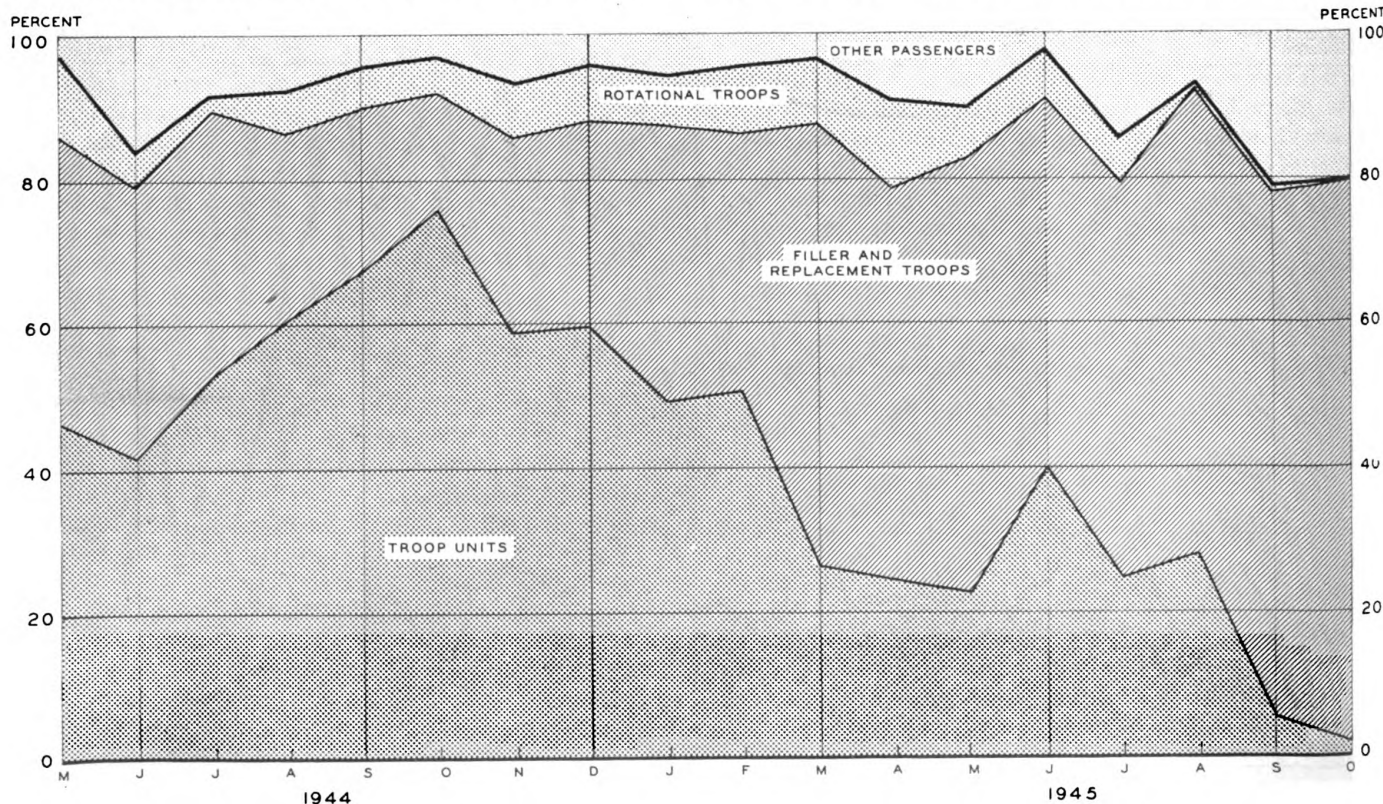
located at Emeryville, California, was the first to be fully developed on assembly line principles, and it was a prototype for similar plants at other ports. During the year 1944 the processing plant of the New York Port of Embarkation, located at Port Johnston, New Jersey, handled a total of almost 90,000 units of equipment.

The many branches and installations of the War Department which were concerned with troop movements, and the many details which had to be carried out in connection with each phase, left many opportunities for errors of omission, as well as commission, in preparing the units and forwarding them to the ports. Early in the war steps were taken to formulate standard procedures, which would clearly establish and define all responsibilities. This led to the publication of a pamphlet entitled, *Preparation for Overseas Movement (POM)*, additional instructions regarding the preparation of Army Air Forces units *AIR-POM*, and a complementary pamphlet entitled, *Identification of Organizational Impedimenta (IOI)*. These instructions appreciably reduced the task which fell upon the port commanders with regard to troops passing through their installations, but the responsibility remained a heavy one.

At the staging areas the troops were under the command of the port commanders, who took all necessary steps to insure that they were ready for oversea duty. Units were brought up to full strength. Individuals who were physically or mentally unfit to move with their units were weeded out and replacements

CHART NO. 8

PERCENTAGE DISTRIBUTION OF PASSENGERS, BY TYPES, EMBARKED MONTHLY BY THE ARMY AT U.S. PORTS



made. Clothing and other individual equipment were inspected and replaced if found not up to oversea standards. Unit records were brought up to date. Personal matters, such as family allotments, insurance, and wills, were taken care of. Pay due up to the time of sailing was disbursed. Deficiencies in practice with weapons were made up. In the early stages of the war the frequent failure of home stations to complete the processing of troops left much work to be done at the staging areas. Latterly, preparations at home stations were much more complete, with corresponding relief to the port commanders.

Every possible means was used to protect the morale of the men while they were at the staging areas. For many this was a critical point in the transformation from trainee to actual soldier. The messes were important from a morale standpoint, and in January 1944 the Chief of Transportation employed an expert mess advisor who gave this matter his special attention. Abundant opportunity was given for entertainment and recreation within the station. The larger staging areas published newspapers which dealt with the lighter as well as the more serious side of Army life. During the staging period instructions were given regarding the routine of the forthcoming embarkation and ocean voyage. Instructions, and frequently practice, were given in abandon-ship tactics and other safety measures.

For reasons of security, embarkations generally took place at night, and the movement from staging area to ship was accomplished with the utmost dispatch. The schedule for this movement was worked out in detail between the embarkation officer and the staging area, and it had to be executed with precision. The men carried their complete individual equipment. They arrived at the piers usually by rail, but sometimes by motor vehicle or ferry. Throughout the journey from the staging area and on the pier they remained in established order, and generally consecutive numbers were chalked on their helmets. As each man passed the embarkation desk his last name was called and he responded with his first name. An officer of the unit was stationed at the desk to identify each individual. On board, the men were conducted to their assigned compartments and they were required to remain there until the embarkation had been completed.

It was found to be absolutely necessary that the ports control the arrival of troops at the staging areas to insure their proper reception and accommodation. At busy ports each incoming movement had to be synchronized with the departure of other troops. Furthermore, it was unwise to have soldiers arrive at the staging areas unnecessarily far in advance of sailing, since they had to be kept under some restraint for security reasons, and it naturally was a period of emotional strain for the inexperienced and the man with strong family ties. The time spent at the staging areas prior to embarkation varied according to circumstances, but it generally was less than one week.

Life on board a crowded troop transport could not be made entirely pleasant, but everything possible was done in that direction. Crowding was necessary most of the time in order to meet strategical requirements with the ships available. The



Troops were moved from staging areas to embarkation piers by ferry, rail, or motor, depending upon the facilities of the port.



Troops filed past the embarkation desk carrying their individual equipment.



Over the gangplank in numerical order.

soldiers slept in "standee" bunks, in tiers three or four high, and used the bedding from their packs. In the beginning they were given two generous meals per day, but later a light lunch was added. Entertainment and sports were provided to the extent that the restricted deck and lounge spaces would permit. The military complement, including the transport commander, transport services officer and chaplain, devoted themselves to the soldiers' well-being to the limit of their facilities. On the shorter routes the voyage was no hardship for well-seasoned men. On the longer routes it unavoidably was tedious.

Homeward Troop Traffic

Up to the time of the German capitulation the volume of passenger traffic returning to the United States on Army transports was in a gradually ascending curve, except for periods in 1943 and 1944 when it was swelled by the removal of prisoners of war from North Africa and Europe, respectively. Prior to VE-Day, the peak month was September 1944, when 146,246 passengers were debarked at home ports. After VE-Day the curve turned sharply upward, and in November 1945 a total of 744,000 passengers was returned from all theaters. The total of Army debarkations from the beginning of the war to 30 November 1945 was 4,860,000 passengers, distributed as follows:

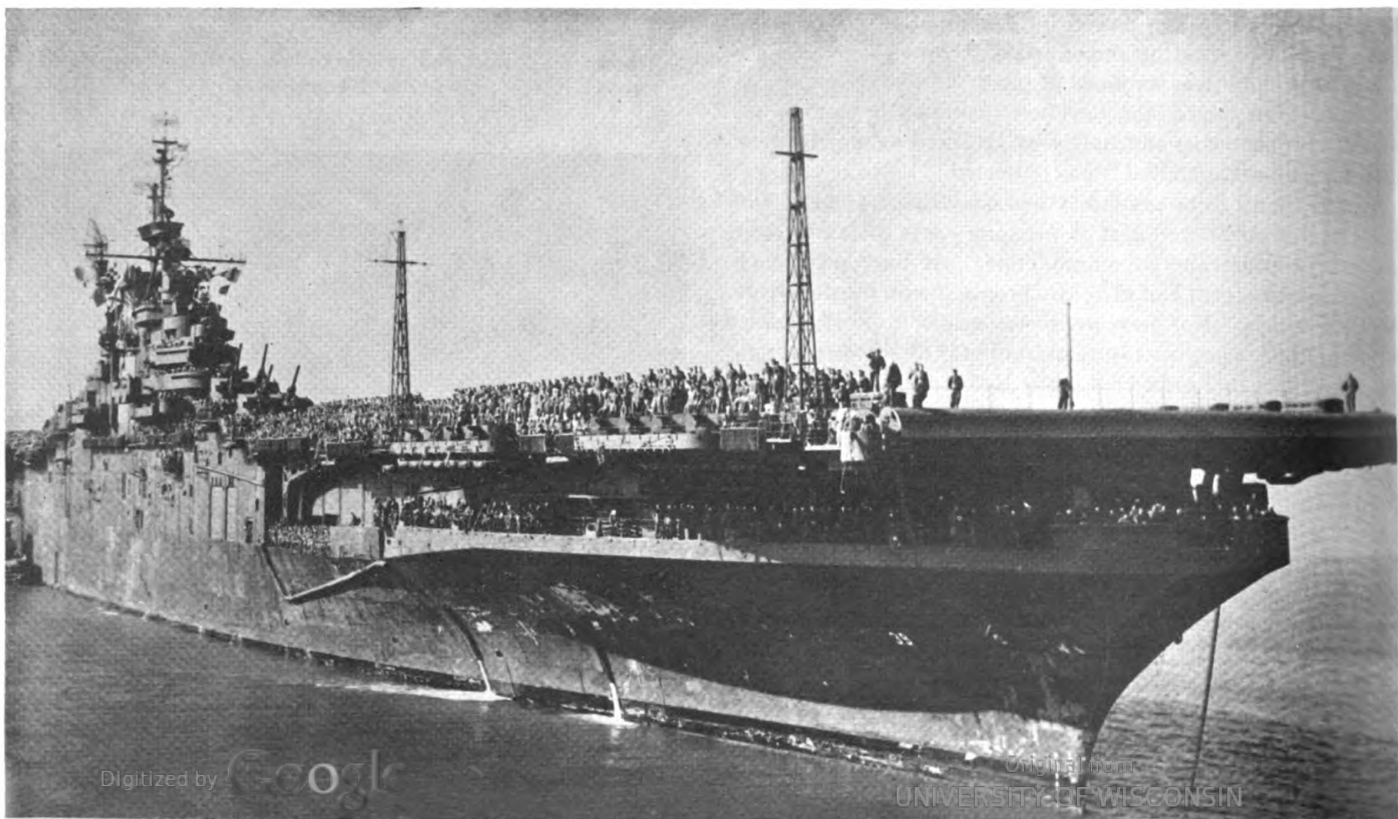
Troops	3,522,000
Patients	487,000
Navy personnel	193,000
Prisoners of war	450,000
Others	208,000
Total	4,860,000

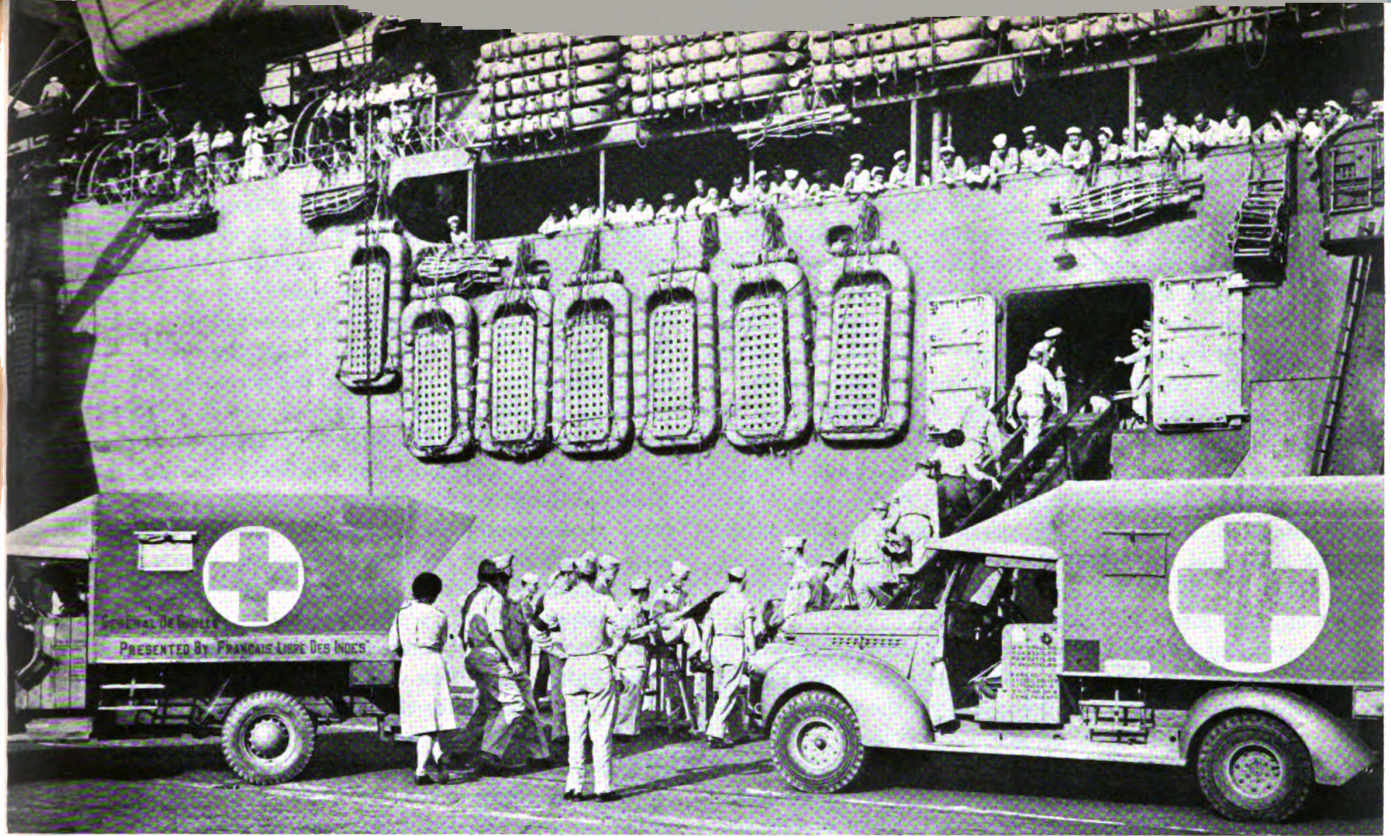
The November figure for debarkations (744,000) was approximately two and one-half times as great as the highest monthly figure for embarkations in World War II (295,170), and it will be exceeded substantially in December. The magnitude of this accomplishment can be appreciated in the light of the fact that following World War I the peak monthly figure for troops landed in the United States was only 342,785 (June 1919), although in that instance it was simply a matter of shuttling ships back and forth across the Atlantic.

This record of returning troops to the homeland was accomplished only by a concerted effort, planned well in advance. Even before VE-Day, plans had been laid to increase the troop lift radically in order to speed up redeployment from Europe to the Pacific, and the repatriation of troops to the United States. The immediate program was to convert about 300 freight vessels, which could be spared in view of the reduced supply requirements of the European and Mediterranean theaters. As it worked out, 210 LIBERTY ships were fitted to carry 550 passengers each, and 97 VICTORY ships to carry 1,500 each. It was arranged also to increase these capacities by about 30 percent during the summer months by placing cots in certain compartments where this could be done without sacrifice of health or sanitary standards.

Following VE-Day it was arranged that seven passenger liners which had been in enemy hands should be turned over to the United States for reconditioning and use as troop ships. It was found, however, that the work on five of them could not be justified, because by the time it could have been completed the vessels would have become surplus as troop carriers. Consequently, only two of the seven—the EUROPA and the VULCANIA—were converted and placed in service.

Troops returning from Europe on an aircraft carrier.





Ambulances await the debarkation of patients.

Hospital train receives patients from a hospital ship at the Charleston Port of Embarkation.



Following VJ-Day it was arranged for many naval vessels to carry returning troops. The Navy already has made available for the joint repatriation operation 178 assault transports, 111 combatant vessels (chiefly aircraft carriers and battle-ships), and 8 hospital ships. Other naval vessels will become available in the Pacific as they can be transferred from service in connection with the occupation of Japan. Army hospital ships also will be used as troop carriers, as they can be spared from the task of bringing back patients. Smaller numbers of troops are being repatriated on numerous freight vessels.

On 30 April 1945 the troop spaces available on ships in Army service totaled 464,138. By 31 July 1945 the number had been increased to 620,355 spaces. On 30 November 1945 the spaces on the vessels under direct Army control, the spaces allocated to the Army on vessels under Navy control, and the spaces on the one British vessel which continued to carry troops for the United States Army (QUEEN MARY), totaled approximately 1,300,000.

The return of patients with utmost dispatch was made a primary objective. Only a part of this traffic could be handled by the hospital ships, and hospital spaces on the regular troop ships were used extensively. An attempt was made to remove as many patients as possible from the European and Mediterranean theaters in advance of VE-Day, so that after Germany's capitulation the maximum amount of space could be devoted to returning troops. All battle casualties had been brought

back from those areas within three months of VE-Day, and according to plan such patients will have been removed from the Pacific by the end of 1945.

All ships carrying patients, whether hospital ships or regular troop transports, were provided with complete medical staffs and equipment. Full provision was made for whatever segregation of patients might be necessary, for the continuance of the medical care which had been provided by hospitals in the theaters, and for meeting any emergencies which might arise on the high seas. In addition to the permanent medical complements provided by The Surgeon General, more than 300 medical hospital ship platoons were activated and trained at the ports of embarkation, using Medical Department personnel. These platoons, which consisted of 2 officers and 15 enlisted men, supplemented the permanent medical staffs, and were used principally on the troop transports, which carried varying numbers of patients. In order to effect complete coordination between the two services in regard to the movement of patients, The Surgeon General maintained a medical regulating unit in the Office of the Chief of Transportation.

The peak month for the return of patients was May 1945, during which 45,562 were landed at United States ports by ships under Army control. At that time 21 of the 26 hospital ships in the service of the Army were in the Atlantic, and were based on the Charleston Port of Embarkation. That port handled little other passenger traffic, and by concentrating

One of the Army's fleet of 26 hospital ships.

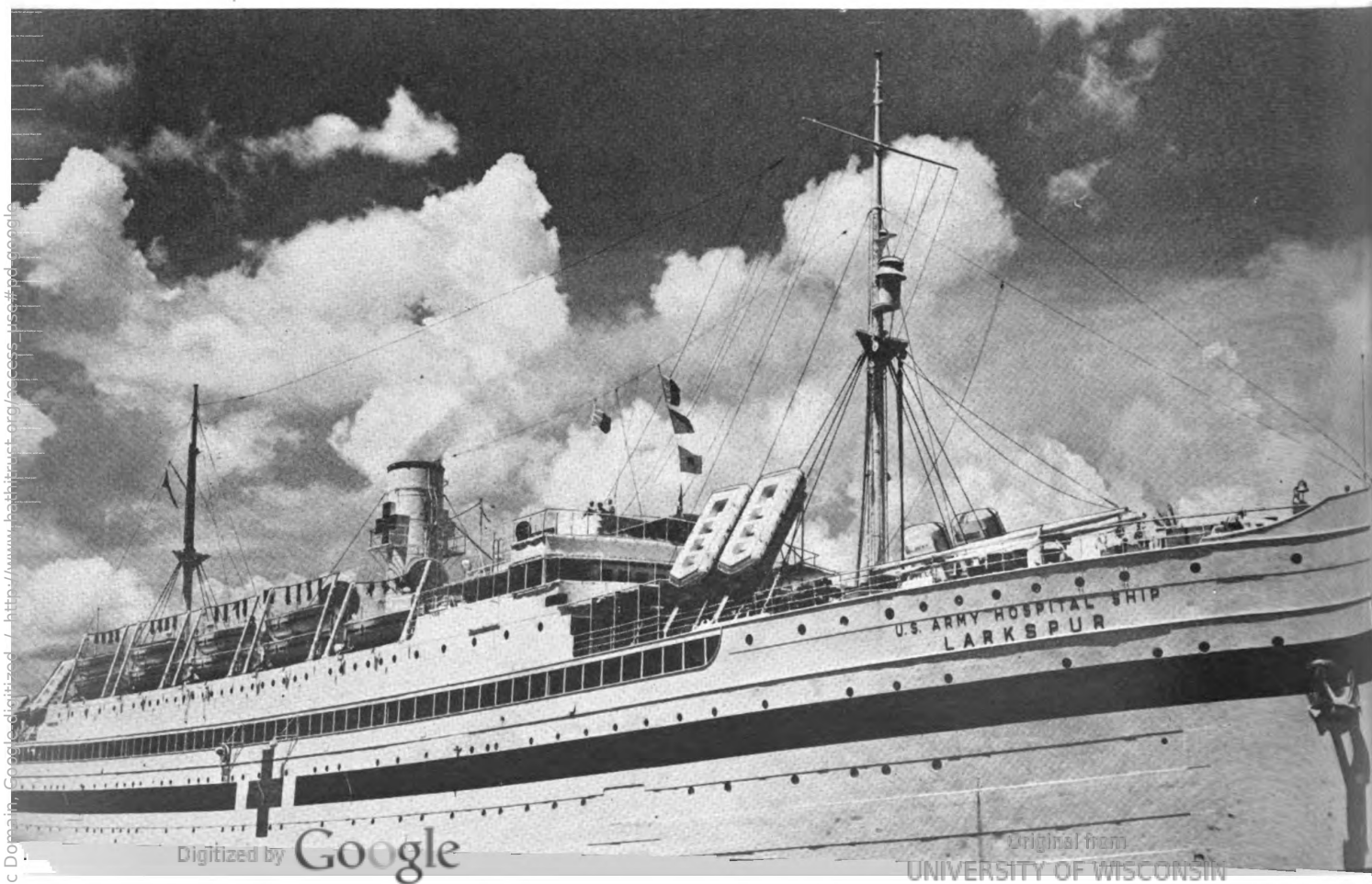
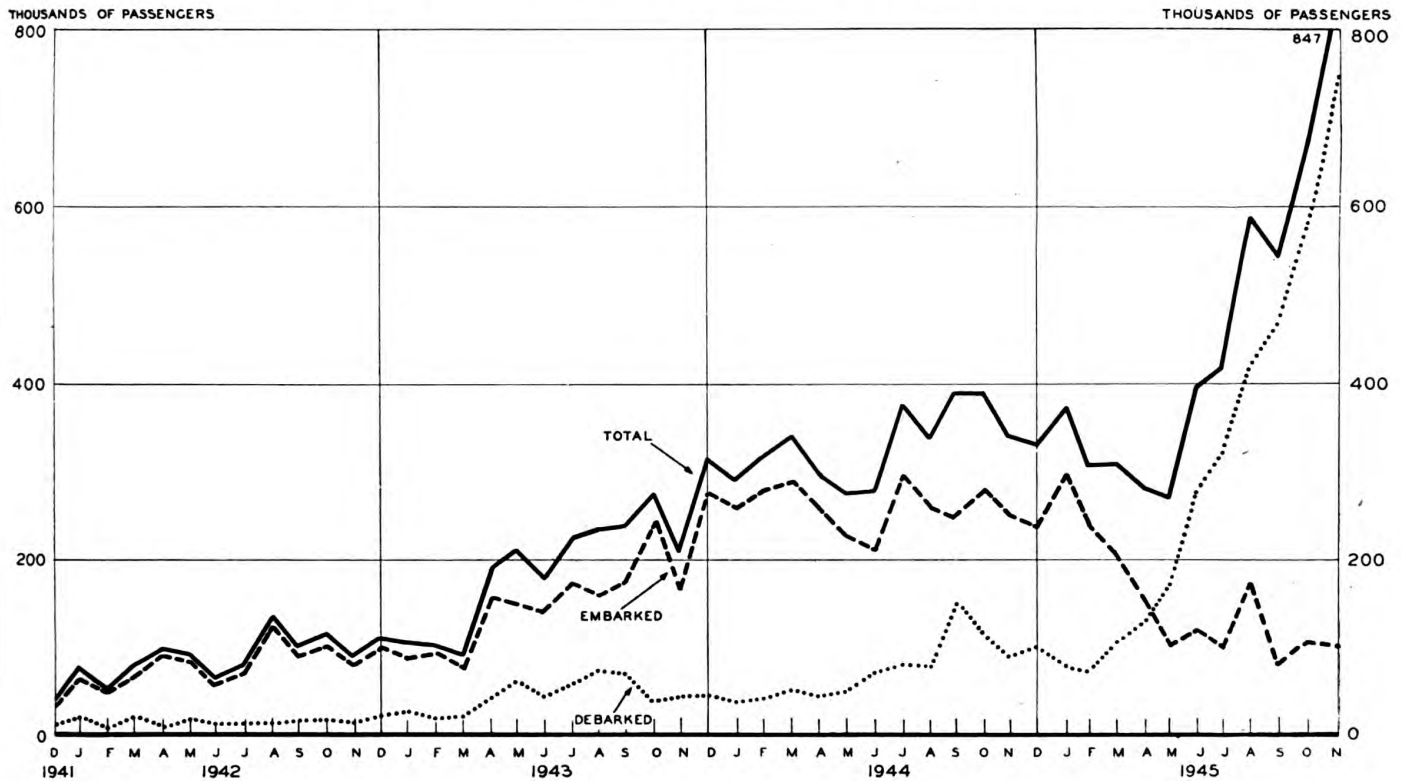


CHART NO. 9

PASSENGERS EMBARKED AND DEBARKED MONTHLY BY THE ARMY AT UNITED STATES PORTS



hospital ship operations there, it was possible to give superior attention to the handling of the sick and wounded, as well as the staffing and supplying of the vessels themselves.

The staging areas at United States ports, which had been established to process troops on their way to the theaters, also handled the returning troops. Those who were to be separated from the service ordinarily spent about 48 hours in the disposition centers which were set up at the staging areas, while their individual and unit records were being placed in order, and their individual equipment was being inspected. Then they proceeded to the personnel centers nearest their homes, where final separation took place. Soldiers who were to remain in the Army spent only about 24 hours at the port staging areas before proceeding to the personnel centers. The movement between staging areas and personnel centers was carefully organized in order to avoid confusion and preserve discipline. Troop train commanders were assigned to each train, group supervisors were appointed for the groups destined to the respective personnel centers, and a car leader was designated for each car.

An Army debarkation hospital was located near each port, and was operated under the supervision of the service command. When these hospitals proved inadequate to handle the heavy movement of patients from overseas, the hospitals at the staging areas were adapted to serve that purpose. At

the debarkation hospitals the facts concerning each case were tabulated and transmitted to The Surgeon General's medical regulating office, where decision was made regarding the general hospital to which the patient should be sent.

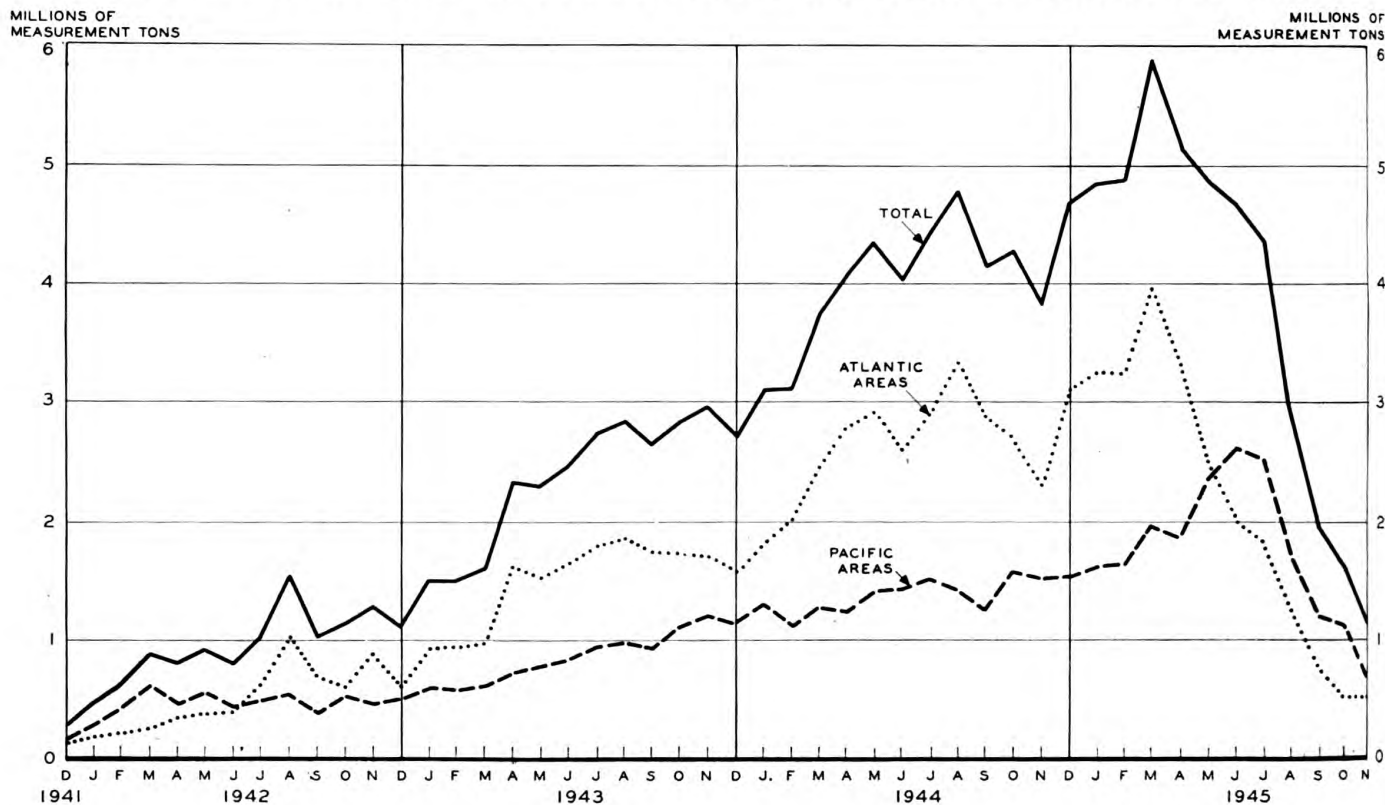
From the termination of hostilities in Europe to 27 November 1945—a period of less than 7 months—3,095,813 passengers were returned by the Army from overseas theaters and bases. Of this number 2,732,348 (88 percent) were returned by ship, and 363,465 (12 percent) by air.

Cargo Movement

To the layman the movement of supplies may seem prosaic and uninteresting, but to the Army transportation officer it is a business replete with interest, even romance. This is because of the unusual and diverse nature of Army matériel, which gives rise to many handling problems, and the knowledge that the arrival of the matériel in the theaters, promptly and in good condition, is a matter of high military importance.

The volume of cargo loaded at Army ports of embarkation during the 45 war months totaled 126,787,875 measurement tons. The peak month was March 1945 when 5,926,764 measurement tons were dispatched. Then the obvious weakening of the German position was reflected in a decrease in total shipments. Following the German surrender in May

CARGO SHIPPED MONTHLY BY THE ARMY FROM UNITED STATES PORTS TO OVERSEAS DESTINATIONS



1945 the decrease in the trans-Atlantic cargo movement more than offset the increase in the trans-Pacific movement. Following VJ-Day total shipments naturally declined sharply. The 45-month total breaks down as follows:

Area of destination	Measurement tons
Atlantic:	
North and South America.....	4,559,842
Africa, Mediterranean, and Middle East.....	27,703,582
United Kingdom and Continent.....	45,300,680
Total Atlantic.....	77,564,104
Pacific:	
North America.....	6,888,398
Central and South Pacific.....	17,611,354
Southwest Pacific.....	18,356,214
Asia.....	6,367,805
Total Pacific.....	49,223,771
Grand total.....	126,787,875

The unusual sizes and shapes of Army cargo, coupled with the fact that a considerable part of the equipment was shipped unboxed, created numerous handling and stowage problems which the stevedore does not encounter in peacetime. The fact that so many items were bulky in relation to weight made it difficult to get the ships down to their marks, and frequently

necessitated the use of ballast. Another factor was the speed with which some ships had to be loaded in order to meet urgent requests from the theaters, which resulted in unbalanced cargoes and imperfect stowing. During the first year of the war great progress was made in the utilization of both deadweight and cubic capacity, by the improvement of techniques for below and on-deck stowage, and as the result of better packaging. Beginning in 1943 and continuing to the end of 1944 the utilization of deadweight capacity on dry cargo ships (except bulk carriers and specialized types) averaged about 75 percent; then with the dropping off of weighty ammunition shipments to Europe it decreased to about 69 percent in February 1945, and again rose to a peak of 82 percent when the decrease in the movement of vehicles, aircraft, and engineer matériel left subsistence and other heavy items a larger proportion of the total cargoes. The utilization of bale cubic capacity maintained an average of about 90 percent during 1943 and the first half of 1944, then decreased to an average of about 86 percent as the movement of ammunition increased and special types of stowage were required more and more.

Several special types of stowage were developed to meet theater requirements. "Commodity loading," which involved filling a vessel with a single type of supply or with supplies of a single service, was employed to simplify the distribution

of the supplies to warehouses and dumps upon arrival overseas. At other destinations it was convenient to have supplies arrive in blocks containing specified quantities of specified items from all services, and this involved "block loading" at United States ports. When it became necessary to move large quantities of vehicles and other light cargo between ports in the Mediterranean and European theaters, ammunition and rations were placed in the lower holds, covered over with flooring, and other cargo stowed above; upon arrival in the theaters the top cargo was discharged and other light cargo stowed in its place, while the bottom or "flatted cargo" remained in the ship until the intratheater movement was completed or the supplies were needed ashore. Vessels which were to participate in amphibious assault operations were "combat loaded," meaning that the matériel which they carried was exactly what the troops would require during the early stages of the assault, and was so stowed that the various items could be discharged quickly and in the order needed. "Operationals" were cargo ships loaded at home ports for use by theater commanders in the support phase of amphibious operations, and accordingly the supplies which they carried and the manner of stowage were carefully prescribed.

During the war a total of 47,851 aircraft was shipped overseas, some crated and some assembled. This was about 56 percent of the total number of aircraft sent to the theaters, the remainder having been flown. The technical problems and delays encountered by the theaters in putting together aircraft which had been disassembled and crated for shipment, emphasized the desirability of shipping as many as possible in assembled condition. A Committee on Aircraft Transportation was appointed by the Joint Chiefs of Staff in the spring of 1943 to deal with this problem. The most noteworthy result was a program for the installation of false decks on tankers for the stowage of assembled planes. Altogether, about 500 American and British tankers were fitted in this manner, and they carried 16,517 assembled and 3,935 crated aircraft, as well as some vehicles. Assembled planes for delivery overseas also were carried by "baby flattops" which escorted merchant ship convoys, and by LIBERTY ships which were converted specially for the purpose. The transportation of so many aircraft in this manner released a large amount of space on regular cargo ships for other purposes, in addition to providing relatively safe passage for the aircraft.

Approximately a million wheeled vehicles were shipped overseas during the years 1943 and 1944. Of this total, 68 percent were boxed and 32 percent unboxed. Improved methods of nesting and boxing were developed early in the war, but even when boxed vehicles were light cargo. Boxing for shipment also involved the necessity of establishing assembly plants in the theaters, which in some cases was feasible and in others not. When shipped "on wheels," or fully assembled, vehicles were considered "balloon cargo." Some of the empty space could be stowed with small package freight, and some types of vehicles could be stowed two deep, but a ship with a large proportion of vehicles generally was a light ship.

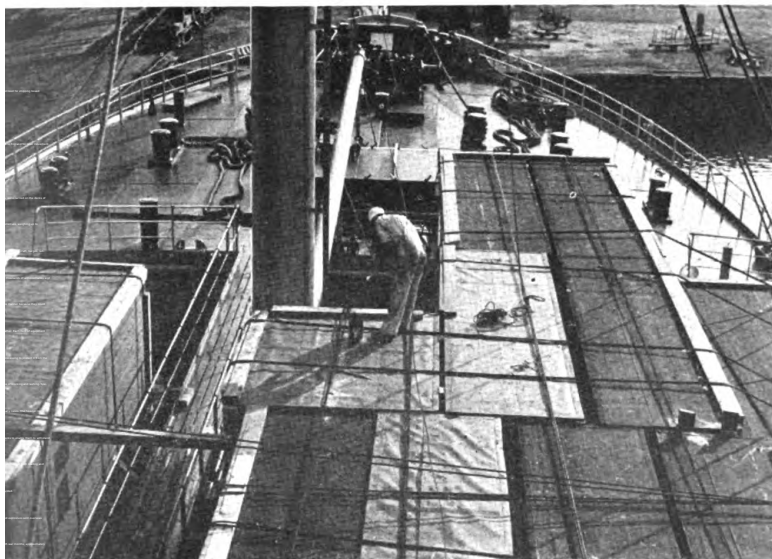
A variety of equipment was shipped on deck, in addition to aircraft and vehicles. During 1944 a number of tugs,



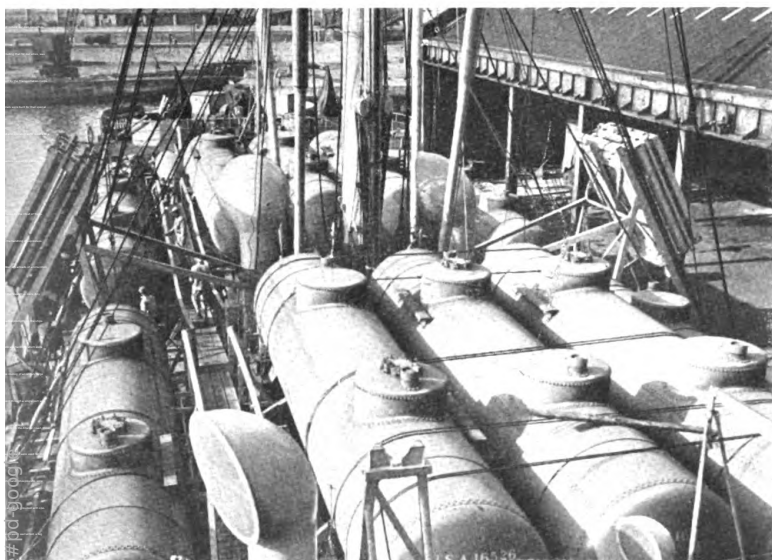
Loading an 8-inch howitzer destined to North Africa.

Thousands of assembled airplanes were shipped on false decks installed on tankers.





All available deck space was utilized for shipping boxed and unboxed equipment.



Deck load of tank cars shipped to England for later movement to the Continent.



some weighing up to 200 tons, were carried on the decks of LIBERTY ships. Numerous locomotives, weighing up to 75 long tons, were deck-loaded. Landing craft, barges, railway tank cars, and, of course, thousands of armored tanks and half-tracks were shipped in this manner because they could be made to withstand the weather. Each item of equipment required a particular type of processing to protect it from the elements, and a particular type of blocking and lashing. Special cradles were needed in many cases. The heavier items necessitated shoring up the decks to enable them to withstand the load, and special lifting equipment at both loading and discharge ports had to be provided.

The amount of ammunition and explosives sent overseas was tremendous. During the 45 war months, approximately 9,500,000 short tons were shipped to the United States forces, and about 2,000,000 tons to our allies, making a total of about 11,500,000 tons. The highest monthly shipment was 685,000 tons in December 1944, when the invasion of Germany was requiring extraordinary expenditures of ammunition to blast out the enemy and reduce our own casualties. Practically all of this cargo, including that for our allies, was shipped over terminals operated by the Transportation Corps. With few exceptions the terminals were built for that special purpose, and were so designed and operated as to reduce to a minimum the possibility of disasters caused by sabotage or accident.

Extraordinary measures were taken by the Chief of Transportation to promote safety in the handling of explosives. Limits were placed on the number of carloads of ammunition which could be held at or near the respective piers. Any carloads which could not be loaded promptly on the ships were sent to special back-up storage facilities which were maintained near each port. The routing of an unduly large proportion of the total movement through a single port was avoided, and altogether eight ports on the Atlantic coast, three on the Gulf, and four on the Pacific coast were used for this purpose. The longshoremen who handled explosives were specially selected and trained, and were provided with specially designed gear. When the occasion warranted, a tug and a Diesel locomotive were kept in stand-by status to facilitate the shifting of cars and ships in case of emergency. All parts of the piers were well-lighted and thoroughly guarded. The result of these precautions was that no disasters were experienced at piers operated by the Army, notwithstanding the large amount of explosive cargo handled over them.

During the heavy movement of ammunition to the European Theater in the winter of 1944-45, a considerable proportion was shipped directly from the manufacturing plants to the piers rather than through ordnance depots. Certain types of ammunition were urgently needed in the theater, and this method effected a considerable saving of time. In collaboration with the Ordnance Department and the War Shipping Ad-

Ammunition lashed to sleds and stowed in a ship's hold in preparation for the assault on Attu.

ministration, the arrival of the shipments at the ports and the availability of the vessels for loading were carefully synchronized. Fast freighters were assigned to this service, and in many cases they received full cargoes of ammunition. The stowage plans for such vessels were worked out in advance, and the installation of racks and sheathing in the holds to insure safe transit was accomplished so as to involve no delay in the loading operation.

There were many other emergency movements of freight which had direct strategical implications. One of the earliest and most important was the shipment of 300 medium tanks and 100 tank destroyers, with spare parts and ammunition, to the hard-pressed British forces in Egypt following the fall of Tobruk. Advice that these tanks were to be moved reached the Chief of Transportation on 27 June 1942. Special trains were run from various tank depots and training centers, and six freighters were assigned to handle the movement. By working day and night, the New York Port of Embarkation had the ships loaded and ready to sail on 13 July. One of the vessels was sunk by a submarine in the Atlantic, but the others proceeded. Replacements for the lost equipment were assembled immediately, and the SEATRAN TEXAS was assigned to lift them. She left New York unescorted on 29 July and, because of her greater speed, was able to overtake the original convoy before it arrived at Suez. The following May, in addressing the Congress of the United States, the British Prime Minister spoke frankly of the vital part which that equipment played in the British victory at El Alamein and in the long pursuit of the German forces across North Africa to Tunisia.

The United States forces which landed in North Africa in November 1942 were short of motor transport from the start, and the shortage became more acute as the campaign progressed and the lines of communications became longer. In the closing days of January 1943, the Commanding General of the Services of Supply, War Department, who was then in North Africa following the Casablanca Conference, cabled instructions for the forwarding of 5,000 2½-ton trucks, and certain other highway and railway equipment, to arrive in the theater at the earliest possible date. Some of the equipment was shipped from New York and Baltimore, but the bulk of it was loaded at Hampton Roads. After a high-pressure job of assembling and stowing the cargoes, the special convoy which had been set up to handle the movement sailed on 18 February. The ships destined to Casablanca arrived on 6 March and those destined to Oran arrived two days later.

In the early days of February 1945 an urgent request was received from the Southwest Pacific for water purification equipment which was desperately needed in badly demolished Manila. Forty carloads of this equipment were given expedited forwarding across the continent to the San Francisco Port of Embarkation, where they were loaded on a waiting

Ammunition pier operated by the Seattle Port of Embarkation—one of a dozen such facilities built during the war.



Special magazines were built at safe distances from the ports to store explosives which could not be loaded on ships promptly.



Barricaded storage tracks near an ammunition pier of the New York Port of Embarkation.



ship which sailed 11 February, five days ahead of the original estimate. During the same month similar service was provided for 400 plywood boats which had been constructed especially for the Rhine crossing. From February 1945 to the end of the German resistance, a continuous expedited service was maintained for items which were critical in the European Theater. These so-called REX shipments, which totaled over 100,000 measurement tons, moved directly from the manufacturers to the ports by fast freight, express, or air, were loaded immediately as top cargo on fast ships, and were given priority handling upon arrival at the discharge ports.

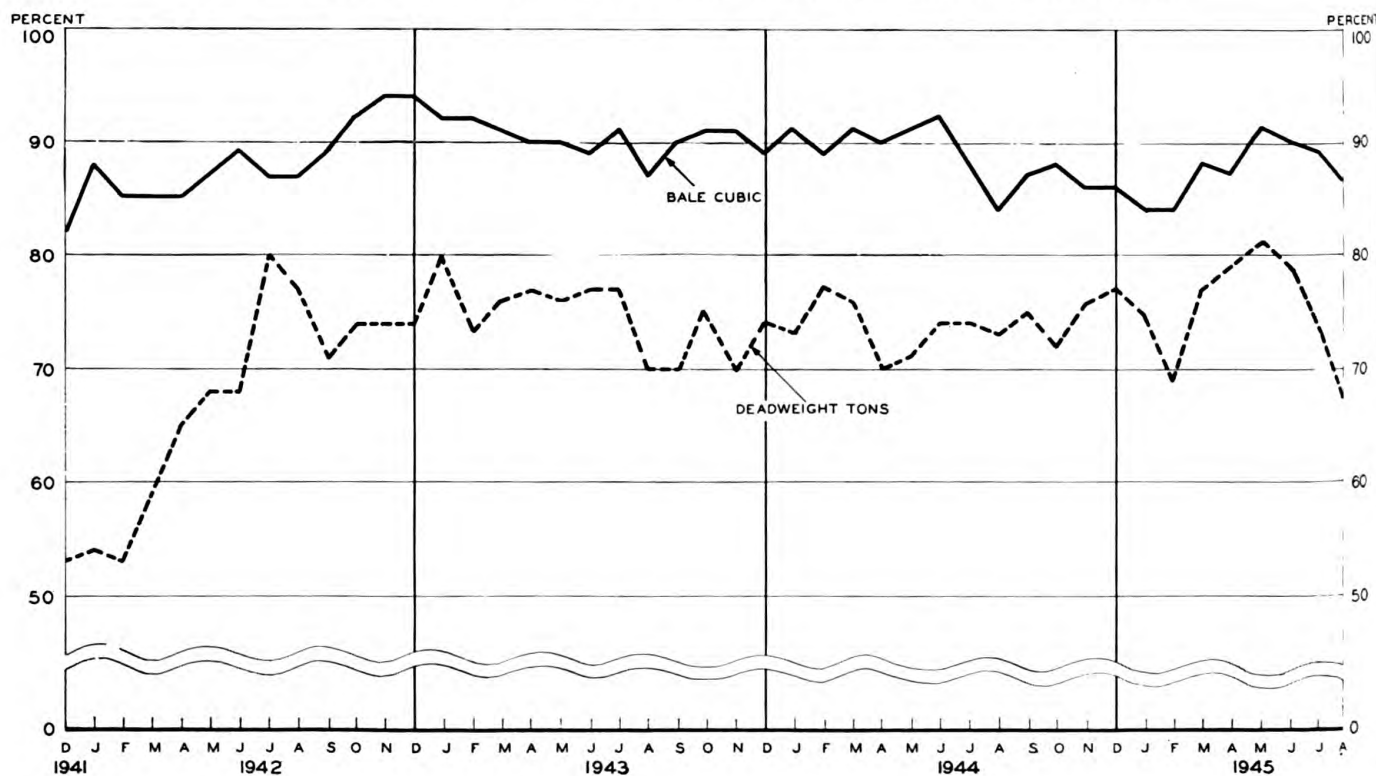
It was found quite essential that each port of embarkation have control over the arrival of cargo at its terminals, whether as ordinary or emergency shipments. The port had to take care that cargo did not arrive in too great quantity, or too far in advance of the vessels that were to lift it, for otherwise the facilities would become glutted and the operation sluggish. The consent of the port of embarkation was obtained, therefore, before unit permits for specific shipments were issued by the Traffic Control Division of the Office of the Chief of Transportation. The Army port transportation officer also controlled the movement of cars from the railway yards to the Army terminals, and the movement of cargo by lighter to ship side.

The handling of cargo was greatly helped by improvements in packing and packaging effected during the war. Prewar methods left much to be desired in that direction. The urgency of loading operations to meet convoy dates, the necessity of night work sometimes with inadequate lighting, the utilization of poorly trained native labor at overseas ports, and particularly discharging under combat conditions, resulted in the loss of much valuable cargo. Many improvements were worked out by the procuring services of the Army through continuous research and testing under operating conditions. The ports of embarkation and the holding and reconsignment points reported faulty packaging as it came to their attention, and these reports were brought to the notice of the depots and contractors involved. A great expansion of the shipment of palletized cargo took place during the war, following experiments to establish the types of cargo best adapted to palletizing, the suitability of such packages for ship stowage, and the availability at overseas ports of fork lift trucks to handle them.

Another vexing and wasteful condition at the beginning of the war was the lack of adequate methods of marking overseas shipments, to insure their proper delivery and to provide the necessary military security. The development of a satisfactory system, to cover both shipments accompanying troop movements and routine supply shipments, proved extremely difficult.

CHART NO. 11

MONTHLY PERCENTAGE OF UTILIZATION OF DEADWEIGHT AND CUBIC CAPACITIES (BELOW AND ON DECK), SHIPS FULLY LOADED BY THE ARMY WITH GENERAL CARGO AT U. S. PORTS



and no substantial progress was made until well into 1943. However, a system was eventually worked out, embracing shipment numbers to identify unit movements, shipping designators (words) to indicate oversea areas, and colors to facilitate the separation of cargoes according to services (Quartermaster, Signal Corps, etc.). The Office of the Chief of Transportation took an active part in this development because it so directly affected the operations of the Transportation Corps, both at home and abroad. The ports of embarkation carefully inspected markings to ascertain whether they were in accordance with the instructions, and submitted reports on violations. Copies of these reports were sent to the technical services involved, for corrective action. The zone transportation officers undertook to aid the shippers of military supplies in properly applying the system, except in so far as the Army Air Forces were concerned.

The paper work in connection with shipments also required complete revision. The War Department Shipping Document was devised in 1943 for the use of Army Service Forces installations. Copies of the document replaced a multitude of forms—shipping tickets, packing lists, tally-outs, receiving reports, dray tickets, dock tallies, hatch lists, etc.—since they included all the information commonly contained in those forms and provided stubs for the entry of additional data. The savings effected by this document led to its being adapted for the use of the Army Air Forces, and to the development of a Vendor's Shipping Document along similar lines. New and more adequate forms for manifesting cargo were developed and machine tabulating methods applied. Methods of giving the oversea commanders a summary by radio of the supplies en route to them, and placing copies of the manifests in their hands without fail before the arrival of the ships, also were put into effect. The matter of shipping documents, which caused so much confusion in the early stages of the war, eventually was placed on a highly satisfactory basis.

Navy cargo frequently was carried on vessels under Army control, and vice versa. In the Central and South Pacific areas, which were under Navy command, a large proportion of Army cargo was transported on vessels under Navy control. Under these circumstances uniform procedures for the two departments were highly desirable. This could not be worked out completely, however, until the spring of 1945, when a manual entitled, *United States Army and Navy Ocean Shipping Procedures*, was approved. It covered such subjects as manifests, stowage plans, passenger lists, baggage lists, transmission of information and documents, and the utilization of information. It was designed to provide a standard system for the flow of information regarding shipments between the United States and the oversea bases, and for intratheater movements in so far as practicable.

It is to be remembered that, in addition to military cargoes, the Army loaded large quantities of supplies for the civilian populations of Europe during the latter part of the war and after the close of hostilities. Such supplies were administered by the United States military authorities in the liberated countries, up to the point where the civilian relief organizations could take over that responsibility. Beginning with North

Africa, even before the Axis forces were finally defeated in Tunisia, the volume of this traffic and the number of destinations increased steadily. During the month of May 1945, the Army moved 570,000 long tons of wheat and flour alone under this program, and its total shipments of civilian supplies during that month were about 879,000 tons. With the heavy movement of coal to Europe, they reached a peak of 987,000 tons in July 1945. The International Division of the Office of the Chief of Transportation, working under the supervision of the Director of Operations, was responsible for coordinating such shipments with the other agencies concerned, and also lend-lease shipments in so far as the Transportation Corps was involved.

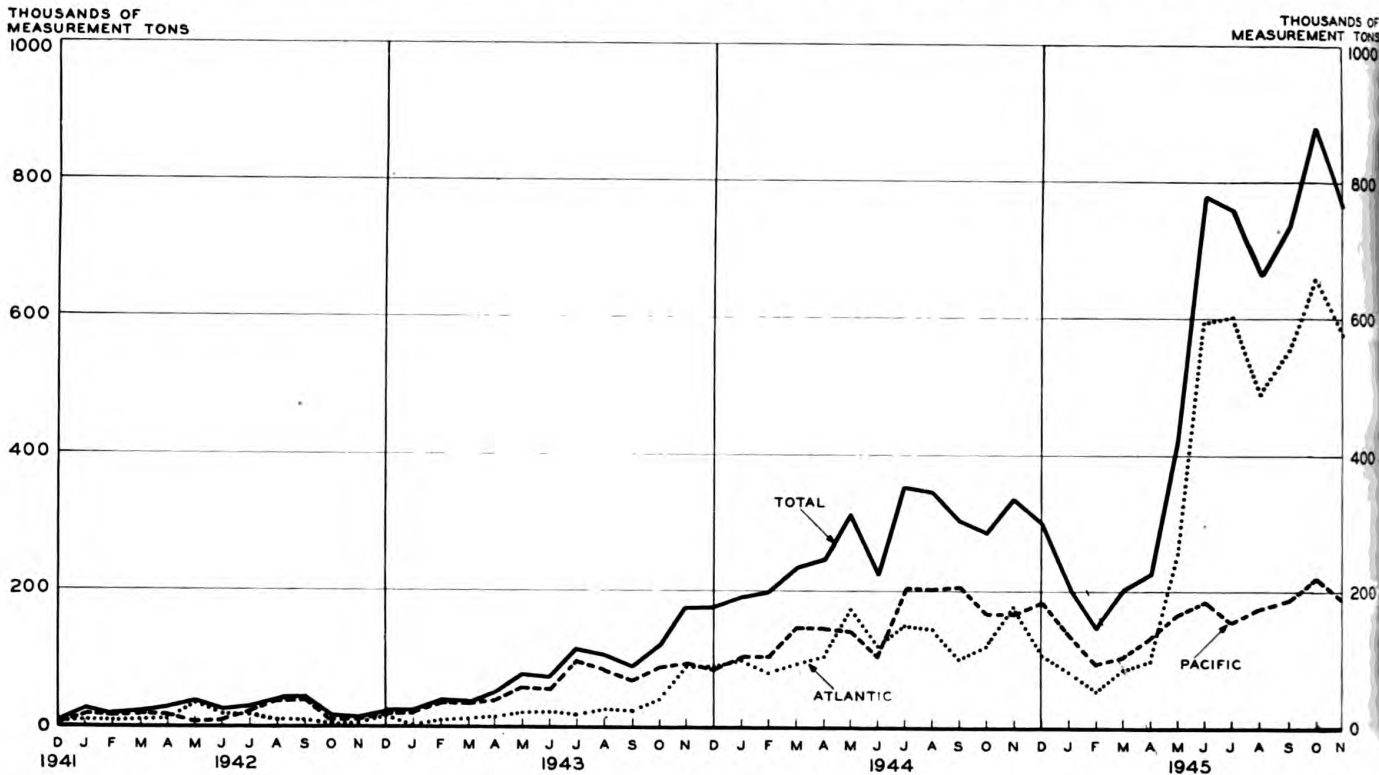
Just as plans had been thoroughly laid before the German surrender, for the handling of railway cars carrying freight destined to northern Europe and the Mediterranean, so plans had matured for the handling of ships loaded with cargoes for those theaters. Action affecting vessels destined to the Mediterranean Theater was taken on 4 May 1945, and affecting those destined to the European Theater on 9 May. In all, 369 cargo ships were involved. Of this number, 234 which were either loading or at sea were permitted to proceed, because their cargoes were either wholly or largely made up of supplies which still would be required by the forces in Europe. Eight vessels which were loading at United States ports were partially discharged and reloaded. Seventy-eight vessels which were fully loaded at United States ports, or were at sea or in European ports, were ordered to discharge at United States ports. Forty-nine vessels were directed to proceed to the Pacific theaters to discharge their cargoes. The surrender of Japan necessitated corresponding actions affecting a total of 511 cargo ships.

Army cargo returned to the United States prior to VE-Day reached its peak in July 1944, when about 350,000 measurement tons were received at United States ports, and it averaged about 300,000 tons monthly until the end of the year. The movement during this period consisted largely of supplies and equipment returned from inactive oversea bases, and salvaged materials. In 1945 the volume dropped considerably until after the end of the fighting in Europe, and then increased gradually, reaching 875,000 tons in October 1945. By far the largest amount received to date has been returned by the Ordnance Department, and the very large preponderance has come from Europe. The ports of embarkation which discharge this matériel, ship it to depots designated by the respective procuring services. Shipments from ports to depots are subject to control by the Traffic Control Division of the Office of the Chief of Transportation, to prevent a congestion of traffic and a wastage of railway equipment at the depots.

In view of the seriousness of the pilferage problem as it developed during the early part of the war, it became necessary to appoint so-called cargo security officers to all vessels carrying 1,000 or more measurement tons of Army cargo, whether the vessels were operated by or simply allocated to the Army. Such officers were to have general oversight of all cargo operations to insure proper handling and to see that measures were taken to prevent pilferage. The problem

CHART NO. 12

MONTHLY RECEIPTS OF OVERSEAS CARGO BY THE ARMY AT UNITED STATES PORTS



in itself was a difficult one, the cargo security officers were of low rank and usually inexperienced, the ships' crews sometimes resented their presence, and the temptation to pilfer did not confine itself to any one class of personnel. The result was that in the beginning these officers in some instances were of little value. Later, however, as the office became better established and the individuals gained in experience, their work had substantial results. In order to further strengthen the position, the cargo security officer was renamed ship transportation officer and was officially designated the representative of the Chief of Transportation on such vessels.

Administration of Oversea Supply

The role which the Army ports of embarkation played in the supply of overseas theaters from early in 1942 was highly gratifying, especially since they had not functioned in that capacity previously. Up to that time overseas commanders had forwarded their requisitions for noncontrolled items directly to the procuring services, while controlled items were shipped automatically by the procuring services in accordance with availability. Special requests by theater commanders were acted upon individually by the War Department. The ports of embarkation were simply links in the transportation chain, with no responsibility beyond storing and loading the supplies which the procuring services shipped. This responsibility was slightly extended in 1941, when, because of the expansion of our overseas

bases and the inadequacy of shipping, large backlogs of supplies accumulated at the ports. To enable the port commanders to decide which supplies should be shipped first, the Transportation Branch of G-4 periodically published priority lists, based upon information obtained from the overseas commanders and the procuring services.

The experience with overseas supply during 1941, particularly after we entered the war, made it clear that a different system was needed to insure that the overseas commanders received what they needed and that the ports were not inundated with supplies which were not needed and could not be shipped. Since the ports of embarkation were channels through which all such supplies passed, and necessarily in touch with both procurement services and overseas commands, they were in a strategic position to serve as a regulating agency. This idea was incorporated in a War Department directive issued 22 January 1942, which defined the responsibilities of all agencies concerned, and charged the port commanders, among other things, with controlling the flow of supplies into and out of the ports, effecting automatic shipments of certain supplies, editing requisitions for other supplies in accordance with established allowances, and recommending the levels for port reserves and the zone of interior depot credits necessary to carry out the supply operation. This directive, which also set up levels of supply to be maintained in the respective overseas commands, was the foundation upon which the overseas supply system, as finally evolved, was built.

Responsibility for the supply of a particular theater was assigned to a particular port. As overseas forces and operations increased, it was found that all supplies for certain theaters could not be forwarded through even the larger ports, but required the use of additional ports. In such a case the original port retained primary responsibility for the supply of the theater, and the ports of shipment, or outports, acted only as its agents. The New York Port of Embarkation, by way of example, had primary responsibility for the supply of the European and Mediterranean theaters, but utilized eight outports on the Atlantic and Gulf coasts in the discharge of that responsibility. The San Francisco Port of Embarkation, which had primary responsibility for all Pacific supply, utilized five outports, including New Orleans. Some of the outports also had primary responsibility for certain of the smaller overseas commands.

This system had two basic advantages. By centralizing supervision of the supply of a large theater in a single port, the dangers of divided responsibility and divergent methods were avoided. By permitting the port of primary responsibility to use a number of outports in carrying out its mission, the entire operation was given flexibility and the danger of overloading any one port was avoided. The primary port, upon receiving a requisition from overseas, was in a position to direct the movement of the requested supplies through the ports best situated to handle them, considering the sources of the supplies, the availability of shipping, and the condition of the ports themselves.

The assignment of primary responsibility for overseas supply was changed in some instances as conditions required, but the alignment in the latter stages of the war was as follows:

Ports	Theaters and Bases
Boston	North Atlantic Bases.
New York	European Theater. Mediterranean Theater. The Azores.
Hampton Roads	Bermuda.
Charleston	West and North Africa. Middle East Theater. Persian Gulf Command.
New Orleans	Caribbean and South Atlantic Bases.
Los Angeles	China Theater. India-Burma Theater.
San Francisco	Pacific Ocean Areas. Southwest Pacific.
Seattle	Alaska.

As promptly as possible after assuming the responsibility for theater supply, the ports of embarkation established overseas supply divisions to handle all phases of the activity. The representatives of the technical, or procuring, services stationed at the ports, who previously had acted independently, were made responsible to the port commanders, and placed under the supervision of the overseas supply divisions in matters affecting those divisions. These officers also were relieved of direct responsibility for domestic supply, and domestic requisitions thereafter were handled by a separate division of the port. The great complexity of the operation and the high

importance of exactness and promptness in supplying the theaters, necessitated large staffs and complex organizations in the overseas supply divisions.

Three methods were employed in the supply of overseas theaters. *Automatic supply*, which in the early days of the war was applicable to all theaters for certain classes of supply, meant that the ports forwarded such supplies without requisitions, in accordance with the theater troop strength. *Semi-automatic supply*, which came into use in 1943 as an improvement over the wholly automatic method, meant that the ports determined what was to be forwarded on the basis of periodical lists received from the theaters showing the quantities of certain supplies on hand. *Requisition supply*, which was applicable from the beginning on certain classes, implied that the ports shipped only what the theaters specifically requested.

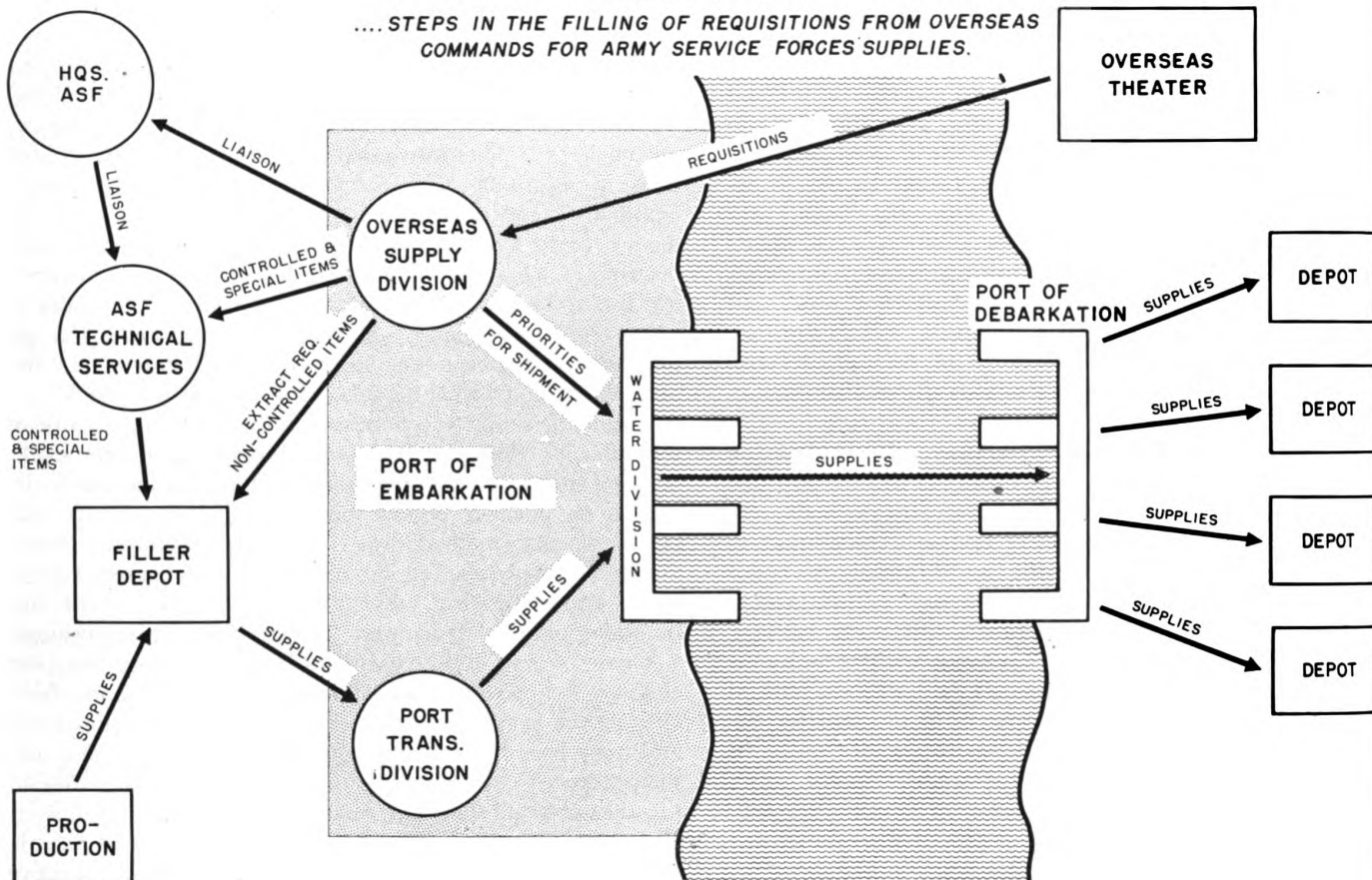
Automatic supply was necessary in the beginning because of the difficulty which the theaters had in determining the stocks on hand and their future requirements, but it had serious faults and as the theaters became better organized and more experienced this method was no longer necessary. Semi-automatic supply also fell into disuse except as regards ammunition and subsistence. Eventually all supplies except ammunition and subsistence were forwarded against requisitions.

Upon receipt of a requisition from a theater, the port edited it for correctness of nomenclature and stock numbers, checked the quantities against established theater supply levels and troop basis to determine whether they were excessive, and then prepared extract requisitions, or in other words parceled the theater requisition out to the several procuring services. Extract requisitions for noncontrolled items were sent directly to the depots which had been designated by the respective procuring services to fill such requisitions, and those for controlled items were forwarded to the chiefs of services for approval. During the time when there were shortages of many items, the filler depots were required to furnish the ports notices of availability on all items, but beginning in October 1944 notices were required only for items which were not available at all or would be delayed in delivery. These notices gave the port opportunity to check with the theater to ascertain if substitute items were desired.

In order to keep their missions clearly and currently defined, the ports prepared monthly supply policy charts for the theaters and bases for which they had primary responsibility, showing the directives involved, the approved supply levels and the troop strength in the respective overseas commands. As a means of enforcing a strict time schedule for the filling of requisitions, they prepared convoy cycle charts for requisitioned supplies which were to go forward on specific convoys, and shipping period charts for supplies which were to move overseas during specified semimonthly periods. The charts divided the operation into five steps with terminal dates for: (1) editing theater requisitions and dispatching extract requisitions to filler depots; (2) processing extract requisitions at the depots; (3) setting up the supplies at the depots and preparing them for movement to the port; (4) moving the supplies to the port; (5) loading the supplies aboard ships. Failure to maintain the schedule was occasion for immediate corrective action by

CHART NO.13

....STEPS IN THE FILLING OF REQUISITIONS FROM OVERSEAS COMMANDS FOR ARMY SERVICE FORCES SUPPLIES.



the Overseas Supply Division. Copies of the charts were sent to the theaters so that they would be informed regarding the delivery of supplies already requested, and could plan their future requirements accordingly.

Each port prepared a cargo distribution chart, showing the sources of supply for each convoy cycle or shipping period. Such charts reflected the type of supply, the marking, the cube and weight, and were used in planning the loading of the ships and in distributing the cargo to the various piers and port areas. A loading committee, consisting of representatives of the Overseas Supply Division which planned the movement, the Water Division which berthed and loaded the ships, and the Port Transportation Division which directed the supplies to the proper terminals, prepared a master loading plan for each convoy cycle or shipping period. This plan indicated where ships were to be berthed and what cargo was to be loaded in each.

In the beginning it was considered advisable for the ports of embarkation to carry so-called port reserves, to be used in filling overseas requisitions when for one reason or another supplies failed to reach the ports from filler depots in time for loading according to plan. These port reserves tended to become quite large, immobilizing supplies which should have been kept moving and tying up great blocks of port storage space. As the depots demonstrated better ability to meet the dates set by the overseas supply divisions, port reserves were

discontinued, and although some port stocks were retained for emergency uses, they never were allowed to become large.

In order to carry out their mission, it was necessary for the ports to maintain constant communication with both the theaters and the procuring services. The overseas supply divisions at New York and San Francisco held daily teletype conferences with the theaters for which they had primary supply responsibility. These conferences dealt with such matters as substitutes for nonavailable items, the assignment of theater priorities to requisitioned items, the expected arrival dates of specific ships or supplies, and the stowage of certain shipments. In order to facilitate their work, the overseas supply divisions were relieved of the necessity of going through the usual channels and were authorized to communicate directly with the procuring services, the filler depots, and with Army Service Forces headquarters.

During the greater part of 1942 it was the responsibility of the port commanders to take steps immediately to replace the cargoes lost en route to the theaters. As soon as a loss was confirmed, the vessel's manifest was utilized to prepare new extract requisitions, and another vessel with a duplicate cargo was dispatched as quickly as possible. In October 1942 the procedure was changed so that the port commanders provided Army Service Forces headquarters and Army Air Forces headquarters with reports of items lost, leaving them to determine which should be replaced and so advise the ports. This avoided

rushing supplies to the theaters, which might be less urgently needed than others which had been requisitioned later.

During the period when the production of many items was in arrears, backlogs of unfilled requests were built up at the ports and there was a tendency on the part of the theaters to duplicate the requests in submitting later requisitions. The New York Port of Embarkation first worked out an agreement with its theaters under which requisitions for certain items would be automatically cancelled by the port if the depots could not make them available within a designated period. Early in 1945 similar agreements were made by other ports with the theaters for which they had primary responsibility.

The procedures which have been described applied only to supplies procured by the Army Service Forces. The Chief of Transportation and the ports of embarkation had no responsibilities in regard to Army Air Forces technical supplies except to provide ocean transportation. Requisitions from the theaters for AAF items went directly to the Air Technical Service Command. This command followed much the same procedure as the ports in processing such requisitions, and it periodically requested the Chief of Transportation to make allocations of ship space for the transportation of its supplies.

In the course of the war it became increasingly necessary to forward Army Service Forces supplies to the theaters by air. Such supplies were shipped direct to ports of aerial embarkation operated by the Army Air Forces, rather than to ports of embarkation. As the volume of this traffic increased it became expedient to station ASF air freight regulating officers at the ports of aerial embarkation to expedite the handling of ASF shipments, check markings and packaging, and see that documents were in order and were handled according to regulations. These officers were assigned by the ports of embarkation and were under the jurisdiction of the Chief of Transportation.

In order to coordinate the work of the ports with Army Service Forces headquarters, and develop uniform procedures as between the several ports, an Oversea Supply Branch was maintained in the Port and Field Agencies Division, Office of the Chief of Transportation. Through its activity, and with the aid of the Procedures Branch of the Control Division, a standard order of procedure for the supply of oversea theaters and bases was prepared and kept abreast of new developments.

The aim of the Chief of Transportation was to have the oversea supply divisions at the ports not only thorough and accurate in their routine operations, but sensitive and immediately responsive to the changing needs of the theaters. The testimonials of oversea commanders indicate that in a very large measure that goal was achieved.

In the larger theaters it was found that supplies required in the combat areas often could be obtained more quickly and more certainly from the zone of interior than from rear bases within the theaters. The zone of interior had a better knowledge of the supplies that were available, more adequate shipping to carry them forward, and more reliable procedures for handling the entire operation. One of the logistical mistakes of the war was to accumulate such great quantities of supplies in the theaters that they could not be stored or issued

properly. Now that it has been demonstrated that supplies can be furnished promptly and reliably from the zone of interior to forces fighting on the opposite side of the globe, this mistake ought not be repeated.

Army Ports of Embarkation

An Army port of embarkation is a large and complicated institution—a complex of installations and subordinate commands. Roughly speaking, it presents a cross-section of all Army activities in the zone of interior, since it embraces not only transportation, but also the housing, training, and equipping of troops, the procurement, storage and issue of supplies, and many subsidiary functions. Since all traffic to the oversea theaters flows through the ports, and since the line of communication can be no stronger than the weakest segment, it is necessary in a global war that the ports of embarkation be adequate in facilities and efficient in operation.

Fortunately, many good facilities, which had been started by the Army during World War I and finished after the Armistice, were still available and in reasonably good condition when our rearmament program was begun in 1940. Such were the Army bases at Boston, New York (Brooklyn), Philadelphia, Norfolk, Charleston, and New Orleans. All of these facilities, except a portion of the Brooklyn base, had been leased to other operators during the peace period, but with recapture privileges, and one by one they were brought back under Army control. As the result of a survey made during the summer of 1941, it was concluded that, so far as the Army's general cargo operations on the Atlantic and Gulf coasts were concerned, the existing Army bases, supplemented by such municipally or privately owned facilities as might be leased, would suffice. In addition to the ports named above, terminal facilities were leased at Searsport, Baltimore, and Mobile.

Table VIII. Passengers and cargo loaded by the Army at the several ports of embarkation, subports, and cargo ports, December 1941 through August 1945

Ports	Number of passengers	Measurement tons of cargo
Boston Port of Embarkation	740,705	8,927,363
Searsport Cargo Port		470,584
New York Port of Embarkation	3,172,778	37,799,966
Philadelphia Cargo Port		5,893,199
Hampton Roads Port of Embarkation	725,880	12,521,868
Baltimore Cargo Port		6,504,029
Charleston Port of Embarkation	35,495	3,215,981
New Orleans Port of Embarkation	166,696	7,240,687
Los Angeles Port of Embarkation	188,270	8,644,847
San Francisco Port of Embarkation	1,657,509	22,735,244
Seattle Port of Embarkation	523,290	10,204,760
Portland Subport	51,827	1,689,075
Prince Rupert Subport	30,904	940,272
Total	7,293,354	126,787,875

NOTE: Subports were operated temporarily at Montreal, Que., Halifax, N. S., and Providence, R. I., under the jurisdiction of the Boston Port of Embarkation, and their outward traffic is included in the figures for that port. Similarly, Mobile was operated for a period as a subport of the New Orleans Port of Embarkation. There was a subport at Juneau, Alaska, and for a period there was a subport at Excursion Inlet, Alaska, both under the jurisdiction of the Seattle Port of Embarkation, and both used solely for the receipt and transshipment of cargo destined to Alaska.



The new Army Base at Oakland, California; a facility of the San Francisco Port of Embarkation.

The situation on the Pacific coast was not so fortunate. The only Army-owned port installation was at Fort Mason, California, and it was not only small but unfavorably situated for expansion. The first move was to acquire facilities in Seattle to serve as a terminal for the Army's steamship service to Alaska, and this was accomplished in January 1941. Plans had been under discussion for the establishment of an Army base at Oakland, California, and definite action to that end was taken during the early months of 1941 by the acquisition of a site which included limited facilities and provided space for considerable expansion. The Army built additional general cargo piers and warehouses at both Seattle and Oakland before we entered the war, and added further facilities afterwards. The Army also built new facilities at Prince Rupert, Juneau and Excursion Inlet, where subports to the Seattle Port of Embarkation were established. Existing facilities were leased at Los Angeles and Portland.

These general cargo terminals had to be supplemented by special facilities for handling ammunition and explosives, located in more isolated areas. During peacetime when the quantities were small, such shipments had been handled over

regular piers or had been loaded at anchorages. The increase of both Army and lend-lease shipments of explosives during 1941 made it clear that numerous special facilities would be required. As a result, before we entered the war, construction work had been begun on explosives piers at New York Harbor, Charleston, S. C., San Jacinto, Texas, and Benicia, California. Proposals also had been made for the construction of such piers at or near Boston, Philadelphia, Baltimore, Newport News, Mobile, Los Angeles, Portland, and Seattle. The proposals included special explosives storage facilities to back up such piers as were not located near existing ordnance depots. This program was approved immediately following Pearl Harbor. It was augmented soon by the construction of a pier and a storage facility at Prince Rupert, and in 1944 by the construction of a pier at Earle, New Jersey, just outside New York Harbor.

The war also called for extensive new facilities for staging troops. Prior to Pearl Harbor, the ports of embarkation which were then active had so-called oversea discharge and replacement depots, where embarking and debarking troops were accommodated. Although they had been expanded

somewhat in 1941, the capacities of such depots naturally were small. When war came, it was necessary to utilize Army camps near the ports and to improvise facilities in public buildings and on piers. The space at the camps was needed for other purposes, and the improvised facilities were very unsatisfactory, so that the construction of new staging areas was necessary. The 11 new staging areas, as originally planned, had a capacity of about 170,000 gross, and 140,000 net, that is, after deducting space for station complements. Later, additional barracks were built, but a considerable amount of space was taken for troops in training. During the early part of 1945 the aggregate net capacity for intransit troops, on the basis of 60 square feet per enlisted man, was about 140,000. This could be increased, if the situation required, by reducing the space allotment per man.

In addition to the pier and staging facilities which have been referred to, the ports of embarkation controlled large warehouses, open storage spaces, railway storage yards, equipment processing plants, marine repair shops, post offices for handling the great volume of oversea Army mail, training ships for seafaring personnel, wet storage for small boats awaiting shipment overseas, and housing for troop units stationed at the ports. The operation, maintenance, and guarding of these facilities constituted a large task, which the ports had to assume as auxiliary to their strictly transportation functions. The fact that at the larger ports these facilities were scattered over many miles of waterfront added to the problems.



In July 1940 there were two Army ports of embarkation—at New York and San Francisco. At the end of the war there were eight ports of embarkation, three subports, and three cargo ports. During this period the personnel of the port organization increased from approximately 3,000 to 180,000. Of the latter figure, 10,000 were officers, 63,600 were enlisted men, 77,400 were civilian employees, 18,000 were civilians engaged under stevedoring and other contracts, and 11,000 were captured Italians and Germans.

As new ports of embarkation were established, before and shortly after our entry into the war, there being no standard form of organization, each commander followed his own ideas. After the establishment of the Transportation Corps, an attempt was made to adjust the organizations to a uniform pattern in so far as practicable, and since the basic functions were the same, a large measure of success was achieved. A typical organization chart, prepared in the Office of the Chief of Transportation, was for the guidance of the port commanders, but its total adoption was not mandatory. Differing local conditions made a certain amount of flexibility necessary.

From the standpoint of handling traffic, there were five general fields of activity. The Oversea Supply Division dealt with the movement of supplies for the maintenance of forces already in the theaters. The Troop Movement Division was concerned with the transit of troops through the ports and their quartering on the transports. Ports which handled large numbers of troop units had an Initial Troop Equipment Division to deal with the equipment accompanying those units. The Port Transportation Division arranged for and regulated the flow of troops and cargo within the general port area, and their distribution to the various port facilities under Army control. The Water Division had charge of the berthing, repairing, supplying, manning, loading, and unloading of ocean-going vessels, as well as the operation and maintenance of the harbor boats assigned to it. The activities of these divisions can be readily identified in the sections of this report dealing with passenger and cargo movements. Because of the close relationship of their activities and the need for complete co-ordination, it was considered advisable to have these divisions report directly to one officer, the deputy port commander.

In view of the difficult handling problems which Army cargoes involve, the shortage of labor and the necessity of giving the vessels quick dispatch, stevedoring required careful and constant attention. In 1939 the two ports of embarkation then in operation hired their longshore labor directly. When new ports were opened, however, stevedoring was provided for on a contract basis, using the well-established organizations at the respective ports. As the traffic grew, a large part of the stevedoring at New York was performed under contract, and some of that at San Francisco. Although conditions varied greatly from time to time and from port to port, general improvement was accomplished both in tons handled per gang

Leased piers at Newport News utilized by the Hampton Roads Port of Embarkation.



Barracks at Camp Plauche, built as a staging area for the New Orleans Port of Embarkation and later used as a training center.



Troops destined overseas entrain at Camp Myles Standish staging area of the Boston Port of Embarkation.



The library at a port staging area.



Open air amphitheater at Camp Kilmer, a staging area of the New York Port of Embarkation.

hour and cost per ton. One factor in this improvement was the careful monthly analysis of contract stevedoring operations at each port, and resulting adjustments in terms when contracts came up for renewal. Another factor was the constant study given to the development of new techniques and the improvement of handling equipment. The following over-all costs per measurement ton for loading general cargo under contract at all Army ports, illustrate the progress made:

March 1944.....	\$1.66 per ton
September 1944.....	\$1.58 per ton
March 1945.....	\$1.50 per ton

Unceasing watch was kept over the supply of labor at the respective ports. This was a factor which had to be taken into account when planning the movement of cargo for succeeding months. In view of the anticipated shortage of longshoremen, early arrangements were made for the assignment of troops to the ports when required. It was a definite policy that troops would be used only when the supply of civilian labor was found inadequate. This became the situation at most of the large ports in the latter stages of the war, and Transportation Corps port companies were utilized. Italian Service Units were assigned to certain ports, but they were employed mostly on the piers and only rarely on the ships. With this use of military labor, anything more than minor delays in working ships was avoided. It was not necessary to postpone any important sailing because of insufficient labor.

Under the control of the Port Transportation Division, cargo for export arrived at the terminals of the ports of embarkation by all available means. The percentages of the total delivery handled by the respective carriers varied widely as between the ports. At New York, for example, a large percentage was delivered by railroad lighter, which was not true elsewhere. At Seattle and New York there were substantial deliveries by coastwise ship and barge. During the year 1944 the percentage of the total cargo delivered to the eight ports of embarkation by each type of transportation was as follows:

Railroad, carload.....	78.6
Railroad, lighter.....	7.2
Railroad, L. C. L.....	1.0
Railway express.....	.2
Motor truck.....	7.4
Coastwise ship and barge.....	5.1
Miscellaneous.....	.5
	100.0

The ports of embarkation carried on extensive training activities. In the early days of the war they activated and trained all port headquarters and port battalions. Later, after training centers had been established, the ports of embarkation activated and trained port companies which could not be accommodated at the training centers, and gave advanced technical training to many others. The first amphibian truck companies were activated and trained at one of the ports. The training of troop transport commanders and cargo security officers was

Assembly-line methods were used by the ports of embarkation in processing equipment for shipment overseas.



handled by the ports. They also trained many units for other services, such as medical hospital ship platoons, quartermaster truck companies, quartermaster service companies, and military police battalions. Besides these troop units and other military personnel, the ports of embarkation trained marine officers and seamen, in order to insure an adequate supply of competent civilian personnel for the transports for which they provided crews.

Some ports were used for loading or discharging Army cargo, at which the traffic did not warrant the maintenance of port organizations. It was arranged, therefore, that any Transportation Corps personnel stationed at those ports in connection with the activities of the transportation zones, could be used in the handling of such vessels. The coastline was divided into areas, and all ports in those areas were placed under the jurisdiction of the commanders of nearby ports of embarkation. They assumed responsibility for any ships handled at such temporary ports, arranged with the zone transportation officers for the use of their local personnel, and assigned such technical personnel from their own port organizations as might be required.

At the time of the Army reorganization in March 1942, the view was expressed by some that ports of embarkation should be subordinate to the commanders of the service commands. This view fortunately did not prevail. The ports are so inextricably a part of the transportation system of the

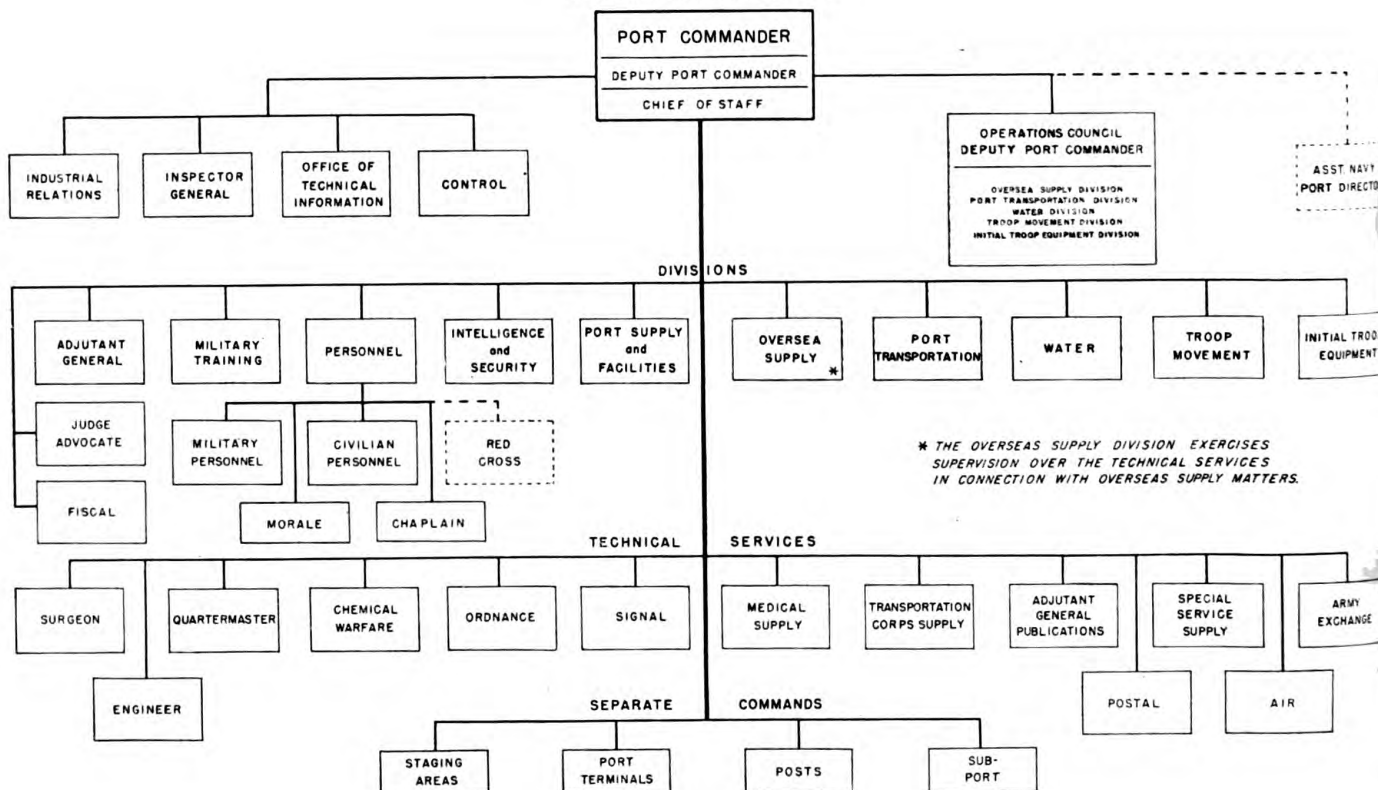
Army, and their functions are so highly technical, that divorcement from the direct control of the Office of the Chief of Transportation and from other elements of the Transportation Corps would be a retrograde step.

As a matter of fact, the Chief of Transportation could take over with advantage some of the functions at the ports of embarkation presently controlled by the service commands, such as special services, signal communications, and public relations. There are several reasons for this assertion. First, the personnel assigned to the ports by the service commands sometimes is not adequate and must be supplemented with port personnel. Then again, experienced service command personnel may be transferred to other tasks regardless of the hardship which that action may impose upon the port commanders. The principal reason, however, is that these functions have a bearing upon troop and cargo movements through the ports and should be entirely under the control of the port commanders who are responsible for those movements.

The Ocean-Going Fleet

The outbreak of war in Europe found the Army operating eight transports out of New York and San Francisco, in service between those ports and to Puerto Rico, the Panama Canal, Alaska, Hawaii, and the Philippines. Of that small fleet, six were combination troop and freight ships and two

CHART NO. 14
PORT OF EMBARKATION
TYPICAL ORGANIZATION, 1 JULY 1945



were freighters. At one time in the summer of 1945 the Army had in its service a total of 1,706 vessels of 1,000 gross tons or more, of which 261 were classified as troop or hospital ships and 1,445 as cargo ships. Many of the cargo ships carried passengers in temporary quarters, and most of the troop ships carried some cargo.

During 1940 the Army added a number of passenger and cargo vessels to its fleet by purchase and charter. At the same time the Navy was building up its transport and supply fleet rapidly. In the early months of 1941, when the shipping shortage was becoming serious, the President enunciated the policy that as far as practicable merchant shipping should be kept in a pool to be employed under the management of the Maritime Commission (later the War Shipping Administration), with allocations to the armed services and other purposes from time to time according to their needs. In line with this policy the Army's further acquisitions definitely were limited. This plan eventually led to a system of ship allocations which met the needs of the Army and made possible a maximum utilization of the nation's shipping resources. The same plan was carried forward after our entry into the war, by an arrangement with the British for the exchange of shipping services when this would promote the cause of the United Nations. Under this arrangement the United States Army had the use of certain British passenger liners, and some exchange of cargo space also was found advantageous.

Of the total of 1,706 vessels in Army service on 31 July 1945, the Army owned 40, and operated 143 on bareboat charter. The remaining vessels were allocated to the service of the Army for one voyage or longer. The 1,706 vessels had a total tonnage of 15,940,000 deadweight. They had a total cargo capacity of 16,192,000 measurement tons, and a total passenger capacity of 620,355, of which 534,453 beds were on troop transports and hospital ships, and 85,902 were on cargo ships.

The 261 troop transports and hospital ships in Army service on 31 July 1945, included prewar American passenger ships which had been converted to war service, vessels which had been built during the war as troop carriers, vessels designed originally as cargo ships but converted to troop ships either during construction or after delivery, the British passenger liners referred to above and certain other foreign passenger liners which had been brought into either the American or British pools. The average troop capacity of the troop ships was 2,314. The largest carriers were the British liners *QUEEN MARY* and *QUEEN ELIZABETH*, each of which on occasion accommodated about 15,000 military personnel. The largest American troop ship was the *WEST POINT* which carried as high as 8,500. Following the German capitulation, seven former enemy passenger ships were assigned to the United States to augment the troop lift, but in view of the time required to recondition them, only two, the *EUROPA* and the *VULCANIA*, saw service under Army direction in the repatriation of American troops.

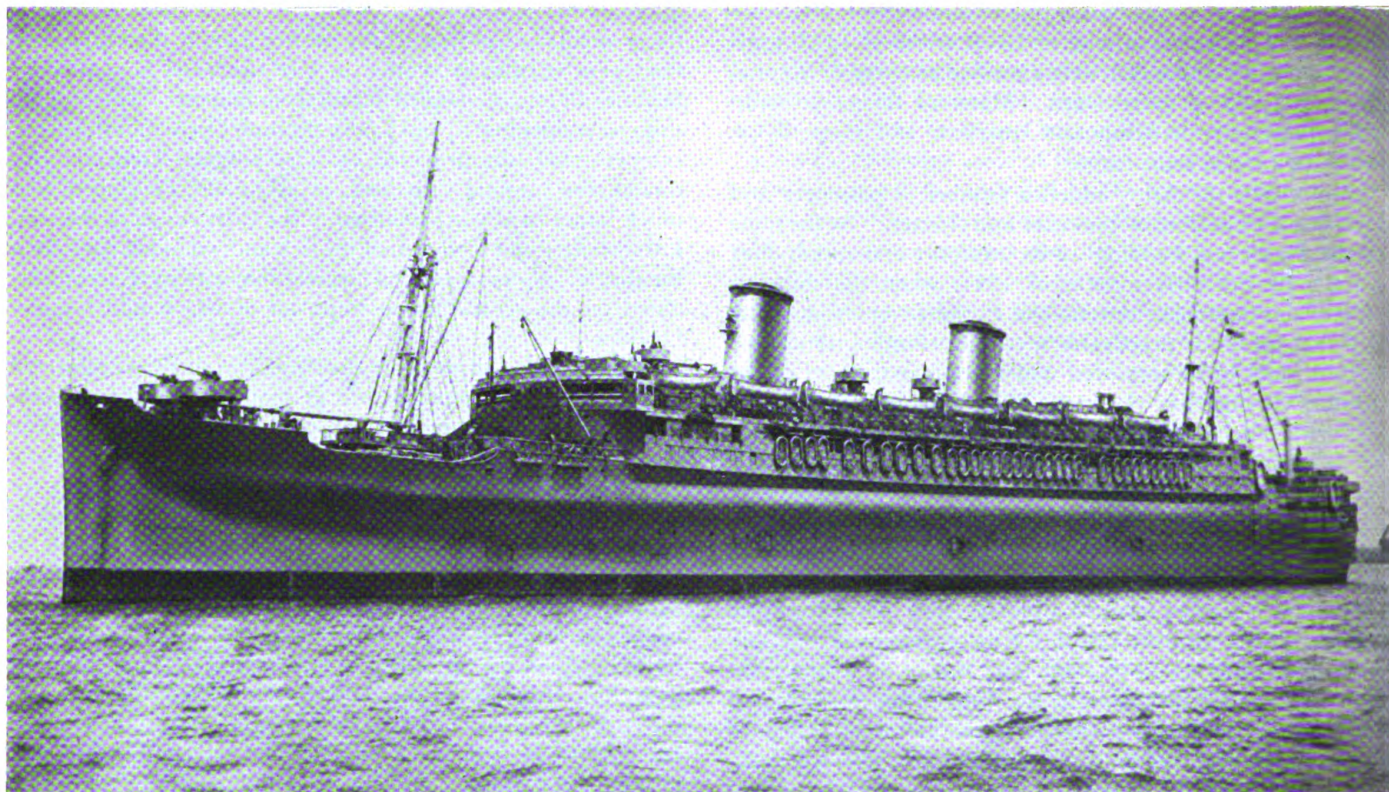
At the end of July 1945 there were 26 Army hospital ships in service, with a total capacity of 16,583 patients. These vessels operated under the provisions of the Geneva Convention and enjoyed the protection from enemy attack which that

international agreement afforded. Most of them were relatively small and old passenger vessels, but in the conversion they were completely refitted to give them the most modern facilities and most complete hospital equipment. The hospital ships were operated by the Transportation Corps, but the medical personnel was provided by The Surgeon General. Although the hospital ship fleet, as eventually developed, was much larger than was visualized in the early stages of the war, it transported but a portion of the sick and wounded back from the theaters of operation. The great majority were accommodated on the regular troop ships, all of which had hospital facilities.

Whereas troop ships under the American flag were allocated to the Army on a more or less permanent basis, cargo ships generally were allocated for the outward voyage only. The War Shipping Administration, which in February 1942 succeeded the Maritime Commission as the managing agency for the American ship pool, took over the cargo ships after they had completed discharge at foreign ports and utilized them to bring back to the United States such military or nonmilitary cargoes as were available. Exceptions to this general procedure were made when the oversea Army commanders required vessels for intratheater operation, or had sufficient quantities of return cargo. Prior to VE-Day, allocations to the Army for homeward voyages were made when the theaters had 1,000 tons or more of matériel and salvage for shipment to the United States. In May 1945 the minimum was raised to 2,000 tons for shipment from Europe.

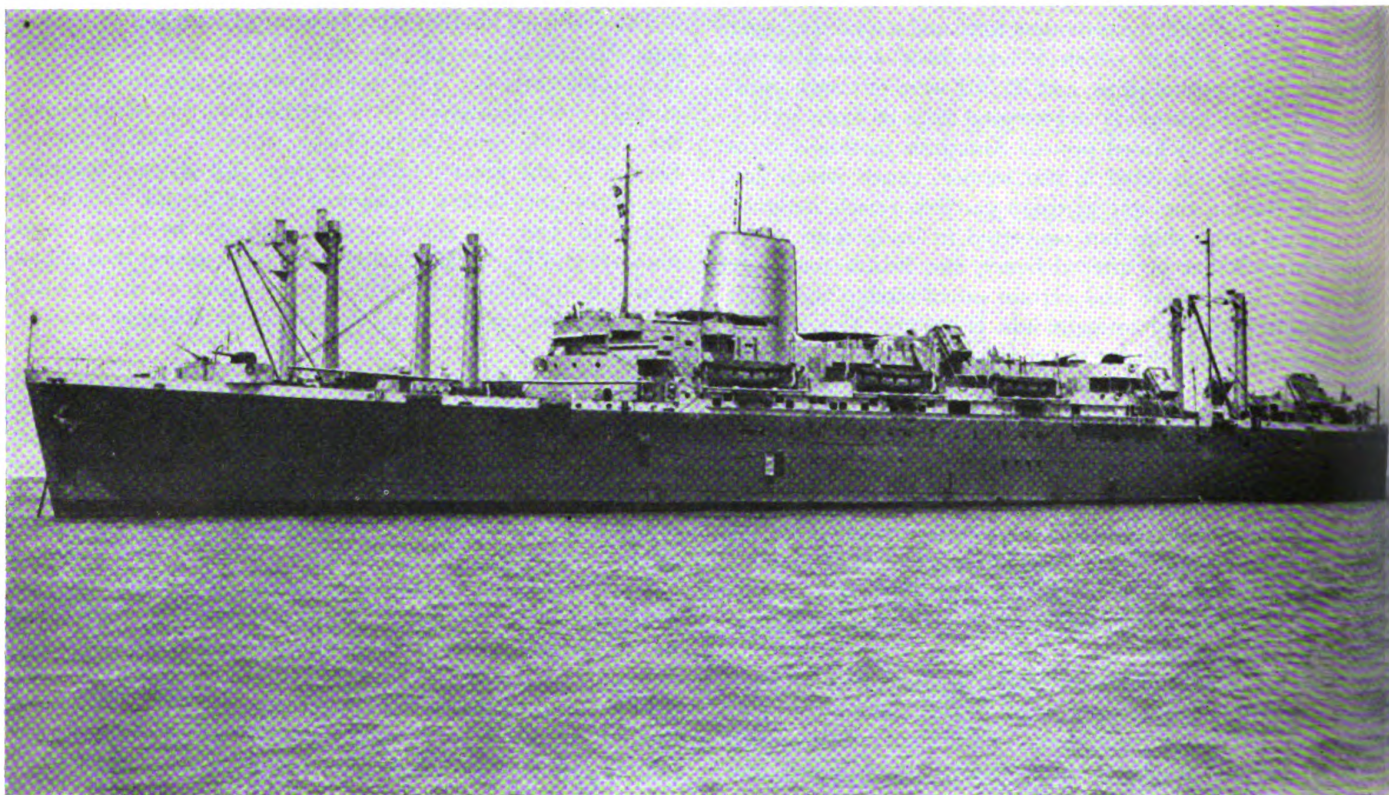
After a general plan for the distribution of cargo shipping to the Army, Navy, lend-lease, and other services had been worked out in the Joint Military Transportation Committee, it was necessary for the Army to arrange with the War Shipping Administration for the allocation of specific vessels to lift specific cargoes. This was accomplished in the beginning at daily meetings, which were attended by representatives of the Water Division, Office of the Chief of Transportation. Because of the great number of ships and services involved, the losses and delays occasioned by submarine attacks on homeward convoys, and emergency requests by oversea commanders and by our allies, allocations were subject to readjustments up to the time loading began. Later when the entire operation had become more stabilized, less frequent meetings sufficed.

Based on experience gained over a period of about three months, an agreement on operating procedures and relationships was drawn up and approved by the War Shipping Administration and the Army in June 1942. This agreement required but little revision and remained substantially in effect to the end of the war. One of its provisions was that all freighters allocated to the Army would be loaded by the Army. Subsequently, there was a proposal on the part of the War Shipping Administration that this be changed so that allocated vessels would be loaded by their operators for the account of the Army. The Chief of Transportation took a strong stand against this plan and it did not become effective. The hour-to-hour adjustments necessary to insure the loading of supplies of the types and in the amounts required by the oversea



MARIPOSA—prewar passenger liner converted to carry troops.

Army Transport JAMES PARKER, another converted passenger liner.



commanders, the special types of stowage which called for a thorough knowledge of operations in the theaters, the need for uniformity in the handling of the particular types of cargo, and the necessity that information as to the ships' destinations and cargoes be guarded with the utmost care, argued conclusively against distributing the loading responsibility to a large number of private ship operators.

Among the 1,445 cargo ships in Army service on 31 July 1945, there were 950 vessels of the LIBERTY type, including 99 (of an eventual 210) which had been fitted in the 'tween decks to accommodate about 550 troops, and 29 which had been converted into special carriers for airplanes and tanks. There were 122 vessels of the VICTORY type, of which 27 (of an eventual 97) had been converted to carry 1,500 troops. The remainder included 169 vessels of the standard designs which the Maritime Commission had developed before the war, and 204 miscellaneous types. Scattered among these various types were about 15 refrigerator vessels and a few animal transports.

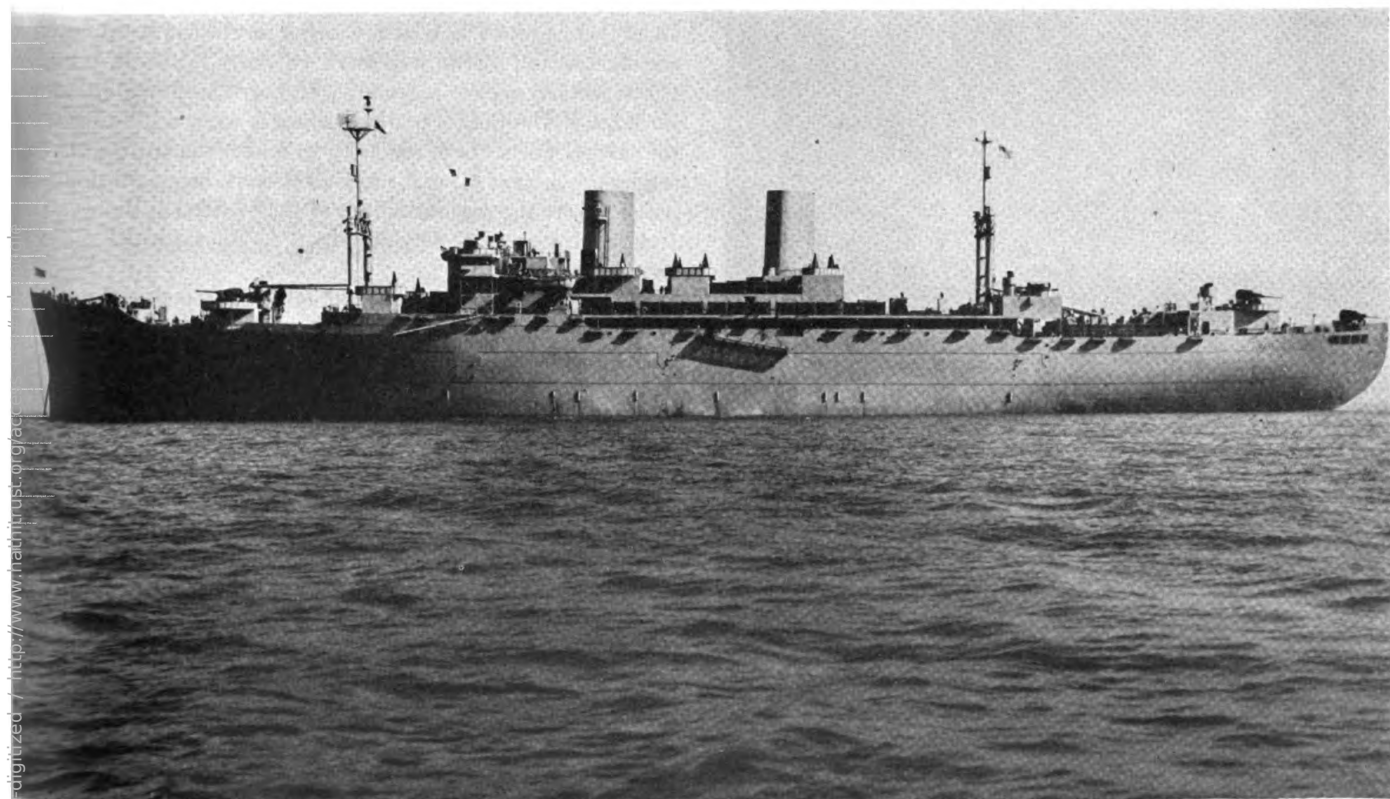
As regards the conversion and repair of ships, the agreement between the Army and the War Shipping Administration was to the effect that such work would be accomplished by one or the other agency, or by the two acting jointly, as might best meet the requirements of the situation. As a result, the Army handled the conversion of many vessels not

owned or chartered by it but intended for its use. Such work, when undertaken by the Army, was performed under the direct supervision of the ports of embarkation and under the over-all control of the Water Division in the Office of the Chief of Transportation. A total of 272 Army conversion jobs was undertaken, of which all but two had been completed by 30 November 1945.

As much repair work as possible was accomplished by the marine repair shops at the ports of embarkation. The remainder of the repair work and all conversion work was performed by private yards under contract. In placing contracts, the Transportation Corps utilized the Office of the Coordinator of Ship Repair and Conversion, which had been set up by the Maritime Commission in June 1941 to distribute the work in accordance with the ability of the respective yards to complete it promptly. The Transportation Corps cooperated with the War Shipping Administration and the Navy in the formulation of a Master Ship Repair Contract, which greatly simplified contracting and inspection procedures, as well as the control of contractors' profits.

The Army was concerned with placing crews only on the vessels which it owned or operated under bareboat charter. This was a sizable task, however, in view of the great demand for seamen to man the rapidly growing merchant marine. Both licensed officers and unlicensed personnel were employed under

Troop transport of the P-2 type, built during the war, which served the Army on many routes.



"Standee" bunks were trimly rigged but left little room for maneuvering.

Enlisted men's mess on a troop transport (center).

Hospital area on a troop transport (far right).

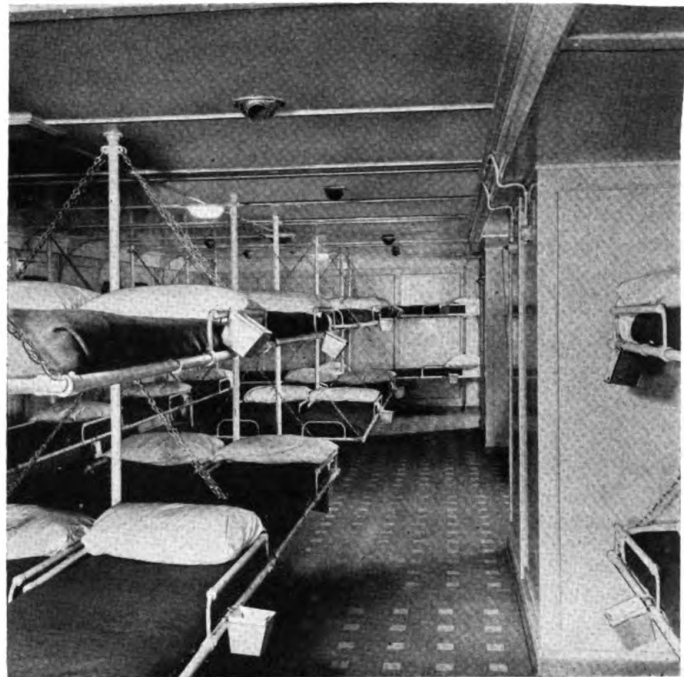
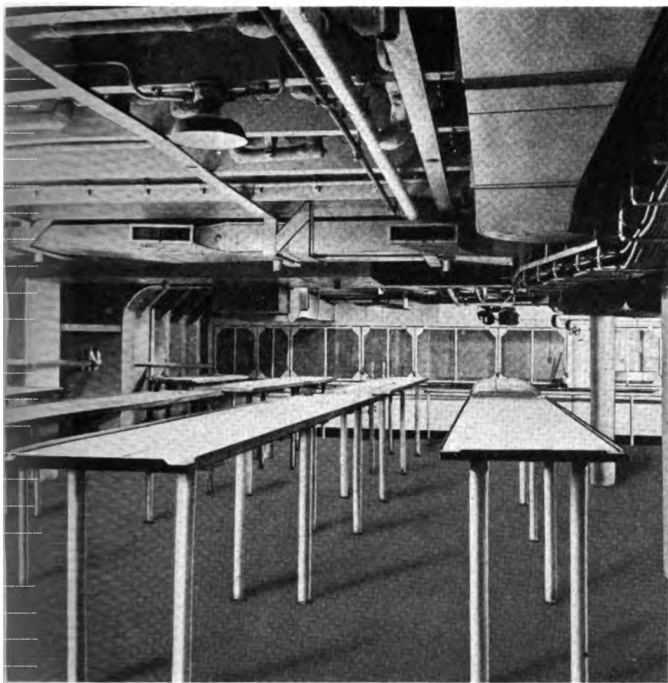
Impromptu musicale during the crossing (below).



Civil Service regulations, but without prior approval of the Civil Service Commission. It was an announced War Department policy that the prevailing wages and conditions should be recognized by the Army, including emergency and overtime wages, war bonuses, repatriation and allotment conditions. In all these matters, as well as war risk insurance, reemployment certificates, and meritorious service awards, the Transportation Corps worked in close harmony with the War Shipping Administration. The details of these matters were accomplished at the several ports of embarkation to which the transports were assigned, whereas general supervision and the establishment of policies were the responsibilities of the Water Division and the Industrial Personnel Division in the Office of the Chief of Transportation.

The several ports of embarkation maintained training programs for the purpose of improving the efficiency of civilian marine personnel serving on ships assigned to them. A Transportation Corps Marine Officer Cadet School was maintained at St. Petersburg, Florida, with the assistance of the United States Maritime Service, until April 1945. At that time its activities were merged with those of the Transportation Corps Civilian Marine School, which was established concurrently at the New Orleans Port of Embarkation to provide any type of marine training which might be required for the fulfillment of the responsibilities of the Chief of Transportation. Although at times extraordinary efforts were necessary to complete the crews of Army transports, it never was found necessary to delay a sailing because of insufficient personnel.

The care exercised in the operation of the messes at the port staging areas was carried forward to the messes on the troop transports. The mess advisor to the Chief of Transportation, and the Marine Operations Branch of the Water Division, saw



to it that proper standards of food were established and observed. This applied to all troop ships, whether under Transportation Corps or other operation. The problem was especially difficult on the freighters which had been converted to carry troops, because of the limited cooking and storage facilities and the scarcity of competent galley and mess personnel. Close cooperation between the Army, the War Shipping Administration, and the operators of the vessels, and the use of military cooks to supplement civilian personnel in the Pacific, brought about a great improvement in the messes on such vessels.

Maximum Employment of Ships

Many factors contributed to the difficulty of attaining maximum employment of ships, notably cargo ships, in World War II. The very fact that there were so many theaters to be served, and that the emphasis shifted from theater to theater and from base to base, posed a much more complex problem than that which confronted the Army in World War I, when the ships were operated in a shuttle service between the United States and Europe.

The paramount problem in getting the ships turned around quickly was connected with retentions and detentions in the theaters. The necessity of maintaining services between rear and forward bases within certain theaters involved assigning ships to the theater commanders, to be retained by them as long as conditions warranted. Commanders of active theaters naturally were reluctant to release any of those vessels, even when they were not actively employed, for fear that they might be needed soon again. On the other hand, it frequently was necessary or convenient for theaters to detain vessels engaged in

transoceanic service, beyond the period normally required for discharge. Such detentions might arise from changes in the strategic situation which made it undesirable for ships to be discharged at the ports originally contemplated, from changing priorities among the several types of supplies, or from inability to start working the vessels promptly upon arrival.

Delays in discharging vessels arose from many circumstances. Some ports were poorly equipped, both as to dock facilities and cargo handling equipment, and at some there was not enough labor available to unload the ships and move the cargo to dumps or warehouses. Early effort was made to remedy those conditions, but with new ports being opened so rapidly, there was for a long time neither enough trained troop units nor enough gear to supply them adequately. Lack of sufficient warehouse space created a temptation to use ships as temporary storage facilities. Theaters with large operations ahead of them tended to be overoptimistic in their estimates of the capacities of their ports, so that they found themselves with more ships on hand than could be worked. In the Pacific, division of responsibility between the Army and the Navy often led to delays in assigning ships to ports for discharge.

Recognizing the problem, the Transportation Corps began making systematic study of ship utilization at oversea ports as early as February 1943. The studies were based on radio reports from the theaters covering each ship in Army service, and they included the time spent in port, as well as the rate of discharge based on total time in port and actual working time. Semimonthly reports tabulating the results were circulated to all theaters, which set up a spirit of competition between theaters and ports and stimulated greater effort. Following a period in the latter part of 1944, when the problem of theater

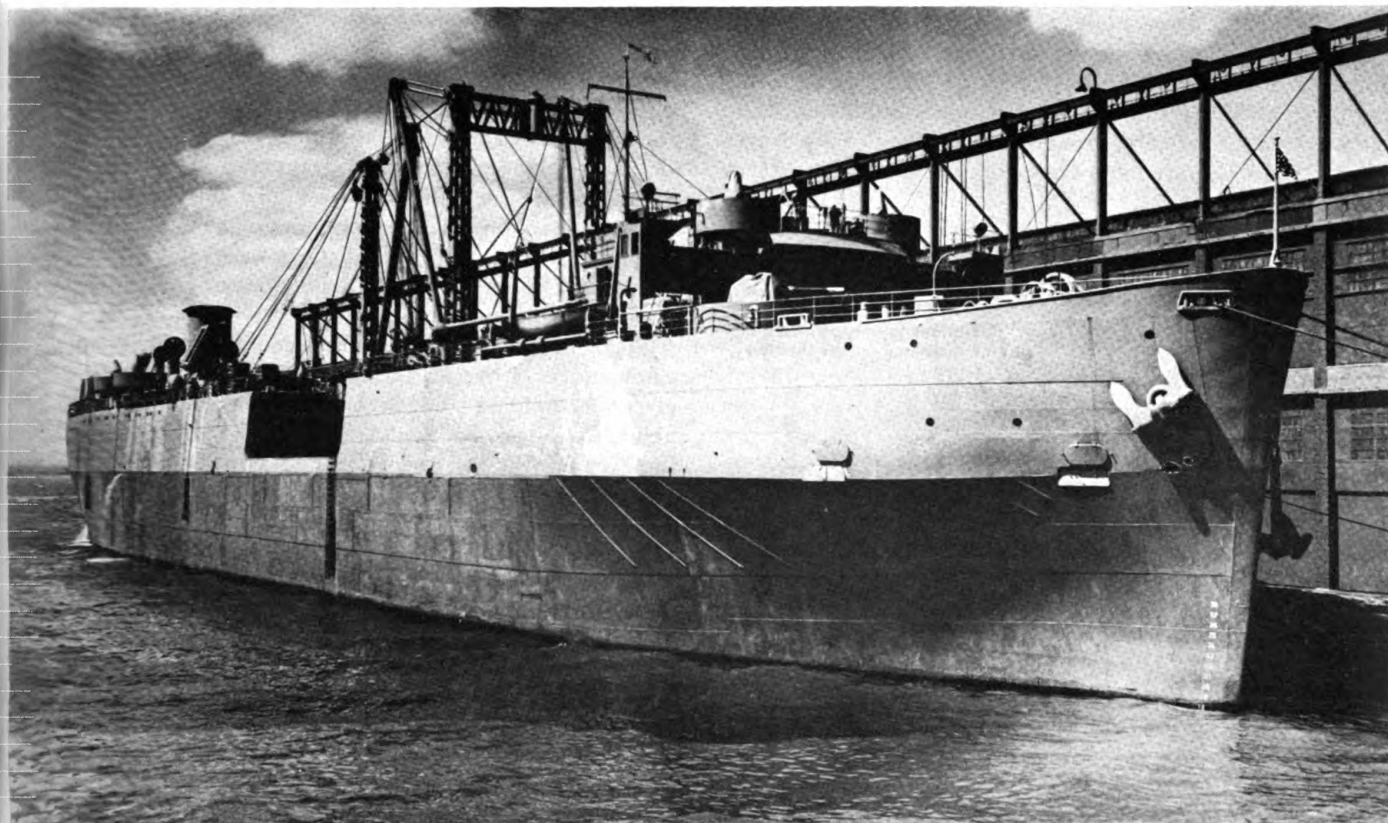
retentions and detentions became particularly serious, this method of reporting and analysis was placed on a uniform basis for the Army, Navy, and War Shipping Administration.

The critical situation of late 1944 appertained principally to two theaters—the European and the Southwest Pacific. On 25 October, because of the enormous quantities of supplies which the theater had requisitioned, the inability to use certain ports which the Germans continued to hold, and delays in establishing an adequate depot system to support the ports,

there were 235 American vessels with Army cargo in Northern European waters, of which about two-thirds were awaiting call to discharge ports. On 15 November, in consequence of the sprawling character of the theater, the limited port facilities, the changing strategic situation, and the divided control of transportation within the theater, there were 275 vessels retained in the Southwest Pacific, permanently or temporarily, in addition to vessels actively in service between the United States and the theater.

Small boat repair yard at the New York Port of Embarkation.





The SEATRIN TEXAS, built in peacetime to transport loaded rail-way cars, moved thousands of tanks and vehicles during the war.

The Chief of Transportation, Army Service Forces, took aggressive action to correct this wasteful use of shipping. His Director of Water Transportation was detailed to the European Theater of Operations to help clear up the situation there, and as the result of actions taken in the theater and in Washington, the backlog of vessels was reduced to half by mid-December, and was further reduced thereafter. In conjunction with the Navy, regulations were drawn up which were designed to reduce unsound theater practices affecting the utilization of ships. The selective discharge of cargo, resulting in only the partial unloading of ships, was ordered discontinued. Realistic estimates of the discharge capacities of ports, taking into account both traffic from the United States and intra-theater traffic, were declared to be imperative. Use of ocean-going ships for storage purposes was forbidden, except as vessels were authorized specifically for that purpose. Ceilings had been established for the number of vessels which could be retained in the respective theaters for local use, and this limitation was made more effective by providing that a ship held in a theater for any reason more than 30 days would be considered a retention and charged against the ceiling.

Equally careful study was given by the Office of the Chief of Transportation to the dispatch of cargo vessels at United

States ports. As most of these ships were allocated to the Army only for the outward voyages, they were under Army control only a portion of the time spent in home ports—about 60 percent. The average number of days under Army control, for all ports, showed a downward tendency, dropping from 13.5 days during the period January–October 1943, to 11.5 for the period February–July 1944, and 10.5 for the period January–March 1945. An analysis of the time spent under Army control in each port was a basis for corrective action when the periods were considered abnormal. The averages for all ports for the first quarter of 1945, taking 1,384 vessels into account, were as follows:

Total days in port	17.2
Days under Army control	10.5
Days available for loading	7.2
Army hours lost	79.2
Awaiting convoy	14.2
Repairs	11.3
Awaiting labor	5.9
Awaiting cargo	8.5
Bad weather	5.7
Awaiting berth	2.2
Shifting berth	2.5
Discharging and other delays	28.9

Because of the large number of widely scattered ports in some oversea areas, the varying strategic situations, and the temporary detention of ships in some theaters for local operations, a comparative study of round voyages is difficult. The following data, for cargo vessels which completed voyages during April 1945, are fairly representative of the latter stages of the war:

Oversea areas	Average days for the round voyage, ex- cluding local operations in the theaters	Average days for the round voyage, in- cluding local operations in the theaters
European	72	73
Mediterranean	79	85
Central Pacific	62	62
South Pacific	83	83
Southwest Pacific	123	200
India	123	123

Small Boats

In December 1940, the Army had 386 small boats for harbor and interisland service in the zone of interior and at the oversea bases. By the end of the war this number had been increased to 12,466 vessels, through the acquisition of some old craft and the large construction program which the Transportation Corps carried out. Of the total, 4,903 were in service or in storage in the zone of interior, and 7,563 were assigned to the oversea theaters and bases.

As regards boats employed in the zone of interior, those assigned to the Army Air Forces and the Coast Artillery Corps were manned with military crews provided by those organiza-

tions. The crews maintained the boats and performed such repairs as they could, but looked to the Transportation Corps for the higher echelons of maintenance and for maintenance supplies and spare parts. The same situation obtained in regard to boats allocated to the service commands. The Corps of Engineers employed certain craft in river and harbor improvements, for which they assumed full responsibility in regard to manning, maintenance, and repairs. Boats assigned to Transportation Corps installations were manned by civilian crews, and their operation, maintenance, and repairs were handled by the installations.

Small boats and other floating equipment assigned to the commanders of oversea theaters and bases were manned with civilian or military crews according to the circumstances. Inability to train civilian and Army crews rapidly enough to meet the expanding requirements of the Southwest Pacific resulted in the manning of some boats in that area with Coast Guard crews. The oversea commanders were responsible for the maintenance and repair of such craft, but they looked to the Chief of Transportation in the zone of interior for maintenance supplies and replacement parts which were not obtainable locally.

Among the 12,466 small boats and other items of floating equipment listed by the Water Division as of 1 August 1945, the following were the more numerous:

Barges	4,597	Freight supply boats . . .	510
Barges (self-propelled) .	145	Tankers (Y class)	104
Lighters	247	Rescue boats	499
Launches	2,676	Tugs	746
Tow launches	1,065	Floating cranes	302
Marine tractors	1,113	Dories	201

TRANSPORTATION IN OVERSEA COMMANDS

Although the transportation organizations and activities in the oversea theaters and bases were solely under the control of the theater and base commanders, the Chief of Transportation, Army Service Forces, had a definite interest in those organizations and certain direct and indirect responsibilities which were vital to their effectiveness.

The distinctive responsibility of the Chief of Transportation was, of course, that of carrying to the oversea commanders the troops and matériel of all services, without which their missions could not be accomplished. The functioning of the Transportation Corps in relation to oversea troop and supply movements has been outlined. Its services connected the production centers, supply depots, and training camps in the zone of interior with the oversea areas where contact with the enemy was made. They constituted an indispensable link in the chain of military effort which finally came to fruition in the combat areas.

Another direct responsibility was the supply of transportation personnel for oversea service. As new theaters were opened, the demand for such personnel became very heavy, and the Chief of Transportation, ASF, was called upon to divorce many valuable officers from his own hard-pressed staff, and also to recruit many experts from civil life, commission and indoctrinate them, and send them to the oversea commanders. He also was responsible for organizing, activating, and training many types of troop units which were required in the oversea areas in connection with the operation of ports, ships, and railways, and other transportation functions. During the war 948 Transportation Corps units, embracing 11,098 officers and 237,142 enlisted men, served overseas.

Yet another direct responsibility was to provide the theaters with marine, railway, and other types of equipment and supplies, which were required for intratheater transportation. This involved not only procuring, storing, and issuing such matériel, but adapting its design to meet the peculiar needs of each theater. During the war approximately 7,500 boats and other units of floating equipment, 90,000 major items of railway equipment, and many other items of supply, were dispatched overseas for the use of the United States Army and our allies.

A less direct and less tangible responsibility was found in the necessity for close contact between the Chief of Transportation, ASF, and the transportation and supply organizations

in the oversea commands. Complete coordination of action, a realization of each other's problems, and a knowledge of each other's machinery and methods were essential. The effort to attain this mutual understanding had to spring from both sides, and it rested with the Chief of Transportation in the zone of interior to keep his organization in an informed and sympathetic relationship to the forces overseas, and promptly responsive to their requirements.

Transportation Organization in the Theaters

Viewed as a whole, transportation organization in the oversea theaters suffered from lack of proper definition in War Department directives, failure to understand the transportation problems involved in conducting offensive campaigns across the Atlantic and the Pacific, and a consequent lack of forethought and planning. Basically, this may be attributed to the absence of an integrated Army transportation service during the peace period. The fact that no War Department directive was issued to correct the situation until almost two years after we had entered the conflict, and that when issued it only partly met the requirements, was due to the difficulty of having the need fully appreciated by higher echelons.

The field service regulations on administration which were in effect when we entered the war (FM 100-10) made water transportation and the operation of docks and a stevedore service responsibilities of the Quartermaster Corps, railways and inland waterways responsibilities of the Corps of Engineers, motor transport the responsibility of a Motor Transport Service which had no counterpart in the zone of interior, and air transport the responsibility of the Air Corps. The coordination of these several services naturally would be in the theater Supply Division (G-4). The experiences of World War I, and the establishment of a Transportation Service in the zone of interior in March 1942, were favorable to the establishment of integrated transportation services in the theaters, but the extent of integration and the form of the organization were left to the theater commanders.

The result was a marked lack of uniformity between transportation organizations in the several theaters. Those that were set up in the early days of the war were found to be inadequate, or unsuitable in certain respects, and numerous

changes were necessary. These differences and fluctuations complicated the task which confronted the Chief of Transportation, ASF, of establishing smooth working relationships with the theaters. WD Circular No. 256, 1943, expressly provided for a Transportation Service in the headquarters of theaters of operation, embracing shipping, railways, highways and inland waterways, and with authority to coordinate air transport with the other means of transport. However, this circular left many aspects of theater transportation untouched, and furthermore it was not immediately reflected in the transportation organizations in established theaters.

The major difficulties which resulted from these circumstances may be summarized briefly. In some theaters there were too many transportation organizations. For example, in the North African Theater of Operations, later known as the Mediterranean Theater, there were not only transportation organizations in the Allied Force Headquarters and the United States Army Headquarters, but also in the Services of Supply and the several base sections. Coordination eventually was achieved by having a single individual serve as Chief of Transportation for AFHQ, NATOUSA, and SOS, NATOUSA. In the European Theater of Operations, lack of a clear-cut differentiation between the responsibilities of the Chief of

Transportation and the G-4 of the Communications Zone was a source of difficulty for a time. In the Southwest Pacific, up to the closing days of the war, the Chief Transportation Officer was handicapped by the fact that the movement of ships was under the control of a Chief Regulating Officer, attached to GHQ. In the Southwest Pacific and the India-Burma Theater the advantage of an integrated transportation service was not recognized until late in the war. A fundamental problem encountered in most theaters, arose from the fact that base section commanders had complete control of certain transportation activities within their areas, making coordination on a theater-wide basis difficult. The essence of a good transportation service is integration, and control cannot be spread over a number of geographical units without endangering smooth and efficient operation.

The handicaps of unsuitable organization were overcome to a certain extent by the personal efforts of the theater chief of transportation and the cooperation of all concerned, but this was a slow and uncertain way of accomplishing the desired results. Therefore, the Chief of Transportation, ASF, on the basis of a close study of oversea operations, drafted a new manual for a military transportation service in theaters of operation (FM 55-6), and submitted it for approval, which is pending.

LSTs discharging supplies on a beach following the invasion of Normandy.



The proposed manual would establish the theater Chief of Transportation as a Chief of Service, within the meaning of FM 100-10, in which capacity he would be the special staff officer for transportation in the theater, concerned with policy and planning. He also would be the traffic manager for the theater and the chief operating officer of the military transportation service. His jurisdiction would include the Military Railway Service, Highway Transport Service, Inland Waterway Service, Intratheater Shipping Service, ports, staging areas, and depots for Transportation Corps supplies. He would have operational control over all nontactical transportation, except that by air and pipeline, in which cases he would have movement control over nontactical intratheater traffic. In other words, the proposed manual would give the Chief of Transportation the position in the theater organization, and the authority over traffic and the means of transportation, which would enable him to maintain a complete, well coordinated, and effective transportation service.

Port and Beach Operations

Formerly it was the general assumption that the use of established ports was necessary to the support of a large-scale invasion. That assumption no longer holds, for repeatedly during World War II large numbers of troops, their initial equipment, and their supporting supplies were landed over beaches as long as that kind of operation was necessary. New types of equipment and new techniques made such an operation possible. It remained true, however, that the possession of good port facilities was of great advantage, and where such facilities were not available for the initial landing, steps were taken to install them as rapidly as possible.

In advance of all invasion landings, it was the task of the Transportation Corps in the zone of interior or in the theater, to estimate the capacities of the ports or beaches to receive cargo and clear it to the supply dumps. When it was anticipated that existing port facilities would be largely destroyed before they could be captured, estimates were made of the speed with which they could be restored. The planners also calculated the number of Transportation Corps troop units, and the amount of Transportation Corps equipment that would have to be provided for their operation. In this way assurance could be given that an invading force adequate for the task could be landed, augmented, and supplied at all stages of the action.

The large ports which became available to the United States forces in good condition generally were in rear areas and had not been in enemy hands. Such were the ports in the United Kingdom, Australia, and India. In the invasion of North Africa, the ports were saved from serious damage by the weak resistance and early capitulation of the French forces. Antwerp was one port of great consequence which was captured in good condition. The possession of the fine facilities at Antwerp, and the neighboring port of Ghent, was a potent factor in the Rhine crossing and the invasion of Germany. In evacuating these ports without demolishing the docks and equipment, the Germans possibly thought that

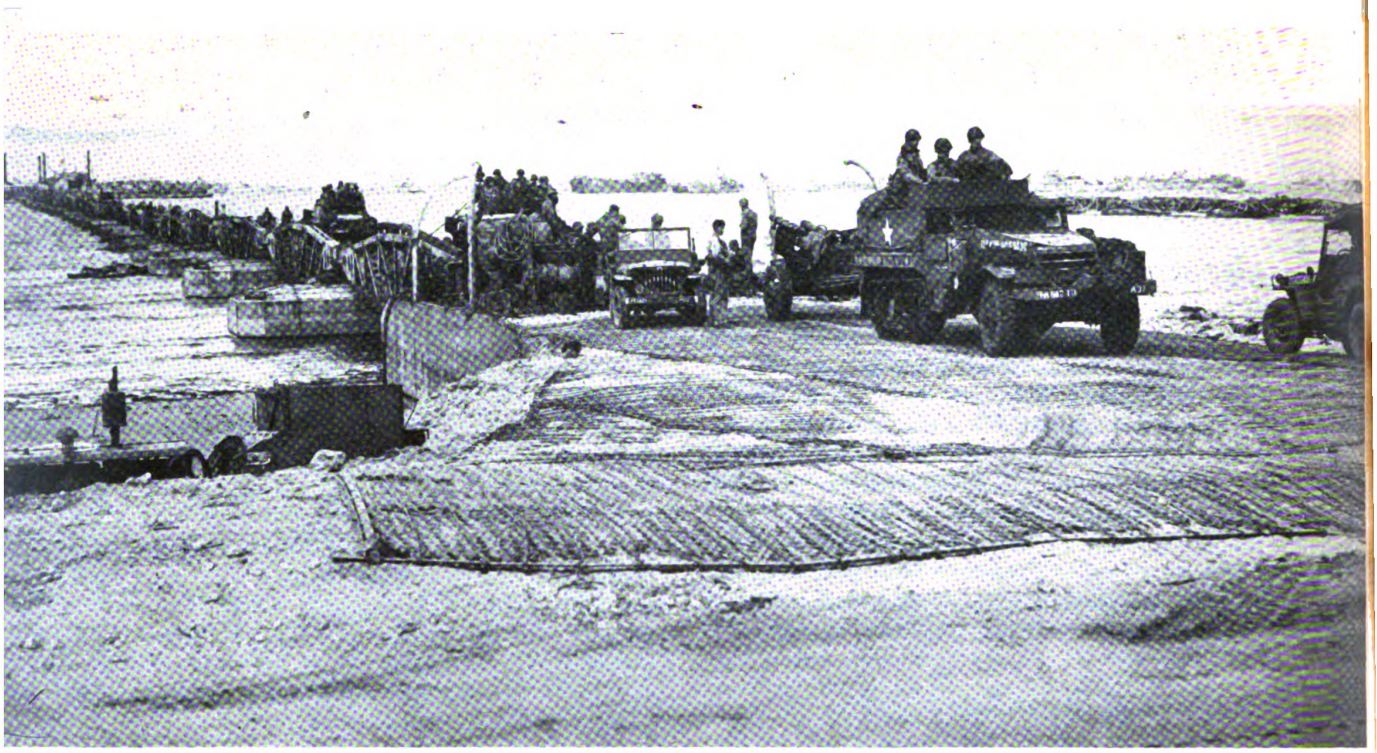
this could be accomplished after our operations had begun, but despite the fact that 4,248 flying bombs and 1,712-rockets fell in the Antwerp area, Allied activities were not seriously delayed. Antwerp discharged more than 628,000 long tons of Army cargo in the month in April 1945, which exceeded the monthly record of any other oversea port under Army operation.

A number of large ports were captured and restored to usefulness after they had been almost completely demolished. Naples was the first, and the operation there demonstrated the excellent results that could be accomplished by teamwork between the Navy in clearing the harbor, the Army engineers in reconstructing port facilities, and the Transportation Corps in landing troops and supplies under difficult circumstances and establishing railway and motor services for port clearance. This ability quickly to restore a large port for the handling of heavy traffic, after it had been badly crippled by our own bombers and enemy demolition squads, was demonstrated repeatedly, as is indicated by the following figures for maximum tonnage discharged monthly at certain ports under Allied operation:

<i>Port</i>	<i>Maximum monthly discharge</i>
Naples.....	516,000 long tons
Cherbourg.....	433,301 long tons
Rouen.....	268,174 long tons
Le Havre.....	198,768 long tons
Marseilles.....	486,574 long tons
Manila.....	400,305 long tons

Many new ports were established in the course of the war. The installations at Khorramshahr and Bandar Shapur at the head of the Persian Gulf, where several million tons of lend-lease cargo were landed for forwarding to Russia, were outstanding examples of large-scale shipping operations being carried on at places where practically no port facilities had existed previously. Similar circumstances attended the Transportation Corps' operations at Lae, Hollandia, and other places in New Guinea, at Saipan and Okinawa in the western Pacific, and at Kiska and Adak in the Aleutians. Smaller operations were set up at many places where deep water ships never had called, utilizing hastily constructed docks. The techniques of the Army Engineers and the Navy for installing such facilities, sometimes on piling and sometimes with the use of pontoons, were noteworthy contributions to the winning of many objectives.

In some instances over-the-beach operations continued so long and involved such tonnages that they fully substituted for large-scale port operations. The beachheads at Salerno supported the invading forces in southern Italy for several weeks until the capture of Naples, landing as much as 29,000 tons of cargo in a single week. Anzio took the place of a good port in supporting the forces as they drove up the Italian boot, handling as much as 49,000 tons in a week. Omaha and Utah beaches on the Normandy coast, aided for a short time by an artificial harbor which had been towed across the English Channel, supported the invading forces almost completely over a period of five weeks, until the port of Cherbourg was captured belatedly and restored to working condition. Together,



Army vehicles landing over a floating dock, or artificial harbor, which was fabricated in England and towed across the Channel to aid in the invasion of Normandy.

Troops land from a LCT at Red Beach, Southern France.



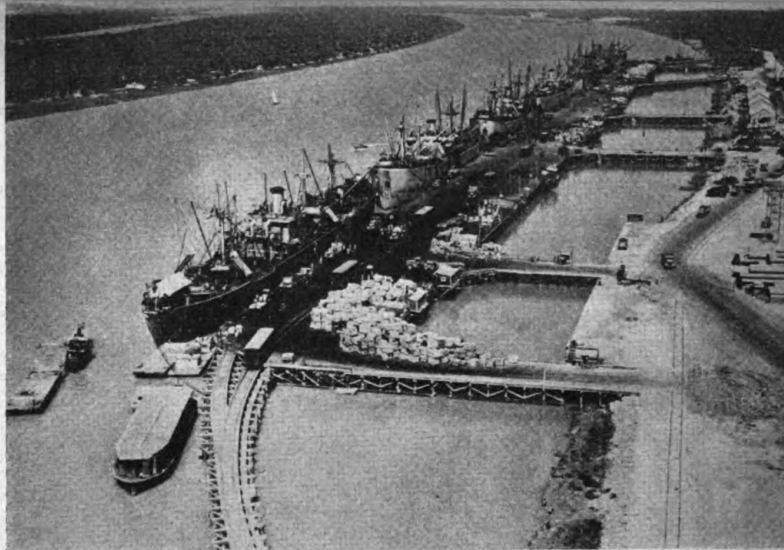
Omaha and Utah beaches discharged almost 2,000,000 long tons of cargo during the 6-month period, June–November 1944, and in the critical month of July 1944 they handled more than 450,000 long tons. Three beachheads were utilized for the invasion of southern France until Marseilles could be restored to usefulness. The invasion of the Philippines was accomplished over many beaches, including Leyte and Lingayen Gulf. In such operations Transportation Corps troops units generally were used in the assault phase to supplement Engineer Special Brigade troops, and then took complete charge when the beachhead had been secured.

The larger oversea ports were operated by port organizations, consisting of headquarters and headquarters companies, with port companies and other attached units. Such organizations were staffed and equipped to handle all phases of port activity, both administrative and operational. Some port headquarters, of which a total of 31 was activated, moved from place to place as the military situation progressed. The Sixth Major Port, for example, was at Casablanca, Naples, and Marseilles. The Fourteenth Major Port, on the other hand, remained at Southampton. Port companies were so organized as to be able to function independently when necessary, and they operated in that way at many ports and beachheads.

Native labor was utilized extensively in oversea port operations to supplement Transportation Corps troop units. At some ports this labor was efficient, at others highly inefficient. But even where it was extremely poor labor, it had to be used because sufficient service troops were not available. In the Pacific the natives generally were found willing and reliable workers. In North Africa they were willing but extremely unreliable. At Calcutta, the port which consistently topped all other oversea ports in rate of discharge, the workmen were numerous and skillful though not especially energetic. At sweltering Khorramshahr, where there were no experienced longshoremen because there had been practically no shipping operations before the United States Army built a port on the barren river bank, the natives were trained and doctored to make them available for certain types of work. In some instances local longshoremen could be used on the ships, in others only on the docks.

The equipment supplied for port operations covered a wide range of craft—tugboats, towboats, barges, floating cranes, amphibian trucks, “sea mules” or motor-propelled marine tractors, floating warehouses and marine repair ships; also crawler cranes, fork lift trucks, and a variety of machines required for efficient dock operation. Although the oversea demand for such items was foreseen, even before we entered the war, and efforts were made to accumulate stocks, the scope which the war took on and the difficulty of getting orders filled resulted in a shortage which never was overcome entirely. This shortage was felt particularly in the Pacific where so many new ports were established, and it sometimes was necessary to strip rear bases of a large part of their equipment in order to supply newly opened forward bases.

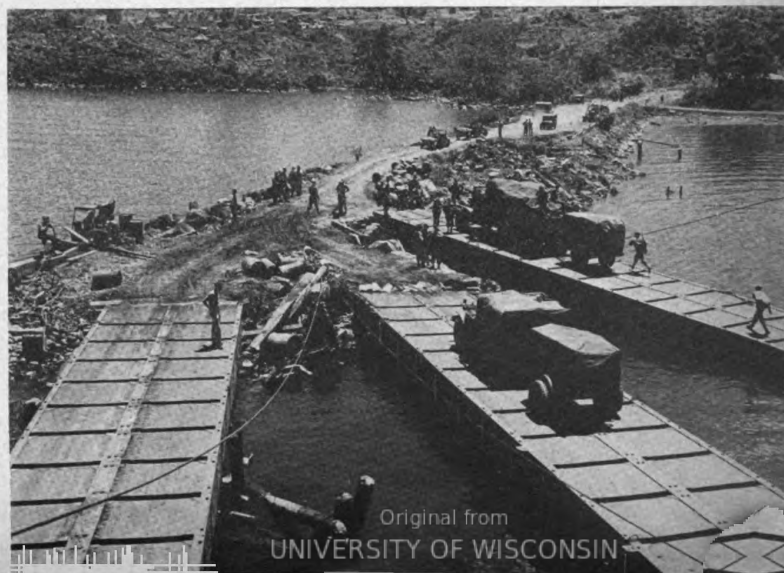
Pontoon dock under construction on Mindanao, Philippine Islands.

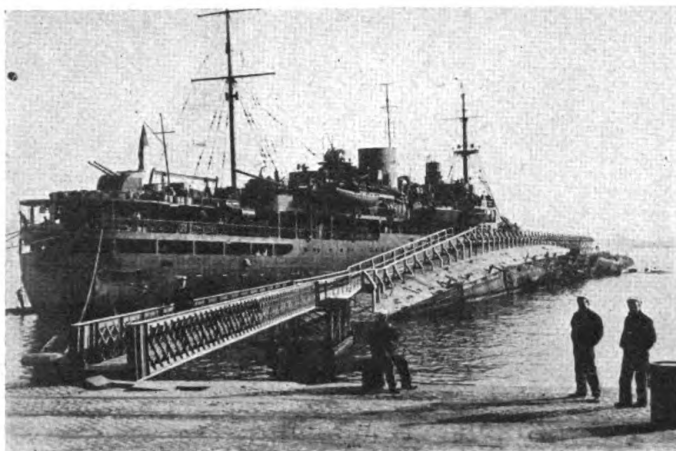


Dock built by the Army and operated by Transportation Corps troops at Khorramshahr, at the head of the Persian Gulf.



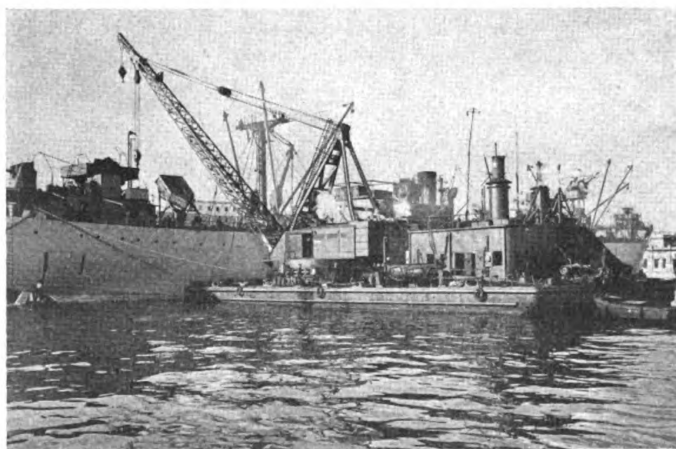
Dock constructed by the Army at Kiska, in the Aleutians.





Hull of ship scuttled by the Germans supports ramp for landing Allied troops at Naples.

American floating crane discharging a freighter at Naples.



Trucks transferring freight from docks to cars at Naples, following restoration of railway service by Transportation Corps troops.



Amphibian truck companies were utilized throughout the Pacific, and they participated in all the beachhead operations in Europe. The amphibian 2½-ton truck, designated DUKW, was one of the outstanding items of transportation equipment which the war brought forth. Several agencies had a part in the development of the vehicle, but the training of troops to operate it was a Transportation Corps responsibility. The utility of the DUKW for offshore discharge and loading operations had been well established in the Pacific when its potentialities for employment in assault operations were tested during the invasion of Sicily, and enthusiastically approved.

Intratheater Shipping

Both in Europe and in the Pacific the approach to the enemy's homeland was made in a series of moves from rear to forward bases. In Europe the invasions by water were relatively few and over short distances, but they were concentrated and heavy. In the Pacific the distances were great and the assault operations were more frequent though of less weight. In either case the number of ships, large and small, required by the invading forces was great. In Europe the British contributed heavily from their large shipping resources. In the Pacific the burden rested chiefly upon the United States.

Large numbers of ocean-going merchant vessels were required steadily for intratheater use. In October 1944 the total number of such ships definitely assigned to the theaters for local operations was 340, of which 195 were in the Southwest Pacific, 136 in the European and Mediterranean theaters, and 9 in the South Pacific. That was the peak, and thereafter there was a gradual reduction—a reduction required because of the need for such vessels for service between the United States and the theaters, and possible because of the rapidly growing number of smaller craft available to the theater commanders. The above figures do not include vessels temporarily held in the theaters, nor the many large merchant type vessels which had been constructed by the Maritime Commission and converted by the Navy for use in assault and supporting operations.

The following assignments of general cargo vessels in the western Pacific in August 1945, illustrate the variety of the requirements in that area. Sixteen ships were assigned to the "roll-up" of equipment and supplies from the New Guinea bases to the Philippines, eight to cargo missions from Australia to the Philippines, eight to the redistribution of supplies between Philippine bases, and three to the support of Australian forces in the Solomon Islands. Seventeen vessels were assigned to move organizational equipment and supplies to Okinawa, Japan, and Korea. One stand-by vessel was assigned to each Philippine base for the emergency movement of equipment and supplies for units participating in the occupation of Japan. Other large vessels and many smaller ones were assigned to the Australian operations in Borneo.

In the very beginning of the campaign northward from Australia it was evident that small boats for harbor, coastwise, and interisland use would be one of the greatest needs. A Small Ships Section was set up promptly in the transportation organization to deal with this problem. All available local

vessels, including some flying the Dutch flag which had been driven out of the East Indies, were acquired by charter or purchase. Arrangements were made for the construction of barges and other small craft in Australia and New Zealand. Heavy demands were made upon the Chief of Transportation, ASF, for craft of all descriptions ranging from supply vessels of almost 200-foot length to small offshore patrol boats. American manufacturers built engines and other equipment for installation in hulls which were being constructed in the Antipodes. In the short coastwise movements which characterized the advance along the north coast of New Guinea, outriggers and other types of native craft were used in carrying forward supplies and small equipment.

In the Mediterranean, and particularly in the operations along the French and Belgian coasts, the Transportation Corps contributed large numbers of barges, tugs, and other craft, which were utilized in support of the invasion forces. The build-up of stocks of such craft for the Normandy invasion began soon after the first American troops landed in the United Kingdom. The great British flotilla was not large enough for an operation of sufficient magnitude to seize and hold the invasion coast. As early as the summer of 1942 a number of converted river boats and ferry boats were sent under their own power to the British Isles. Later, knocked-down barges were shipped in large numbers, for assembly in England, and some sea-going barges were towed across the Atlantic. Small tankers, or "Y" boats, were among the most urgently needed equipment. In the spring of 1944, with invasion fixed for the early summer, there was pressure for additional tugs, which the Transportation Corps made haste to provide. Some of the larger tugs crossed under their own power, but the great majority were forwarded on the decks of cargo ships. Probably the major loading operation undertaken at the port of New York was the placing of two 200-ton tugs on the after decks of LIBERTY ships. The only lifting equipment in this country equal to the task was the former naval ship KEARSARGE, which had been converted into a crane ship.

In theaters where marine operations played an important role, a committee or board was formed to deal with matters of ship allocations, diversions, berth assignments, and similar problems. Such committees included representatives of the Army, Navy, and War Shipping Administration, and of the British Admiralty or Ministry of War Transport where there were British interests. While primarily concerned with transoceanic shipping, these bodies also dealt with the utilization of coasters and the other small craft which were available locally.

The crews for the coastwise and interisland boats operated in the theaters were provided chiefly by the Transportation Corps, although some boats were manned by the Coast Guard, and some seamen were engaged locally. Harbor craft companies were activated and trained as troop units by the Transportation Corps, and sent to the theaters where they were distributed to vessels as required. A Marine Officer Cadet School was conducted by the Corps to qualify men of limited experience for civilian officer ratings and other

positions on small boats. Experienced civilian marine personnel was engaged by the Corps under term contracts to man tugs and other general-purpose craft in the theaters. Broadly speaking, this type of employment was not attractive to civilians who readily could obtain work in the United States, and because of the urgency of the need it sometimes was necessary to engage men of inadequate experience and doubtful reliability. Although an effort was made to increase their usefulness by training, many of them failed to perform satisfactorily. In the early days of the war, meeting the requirements of the Southwest Pacific for small boats was no more of a problem than finding the crews to man those boats. It was under such circumstances that it was decided to use Coast Guard crews so far as might become necessary.

Military Railroads

Military railroads have been a factor in strategy since the middle of the nineteenth century. The military railway operations in World War II, however, far exceeded any earlier operations both in scope and intensity. The large numbers of troops and the large quantities of freight to be moved were in themselves a challenge to the Army's railroaders. The great diversity of conditions found in operating on four continents, and the systematic bombing of railway facilities, added obstacles and problems not previously encountered.

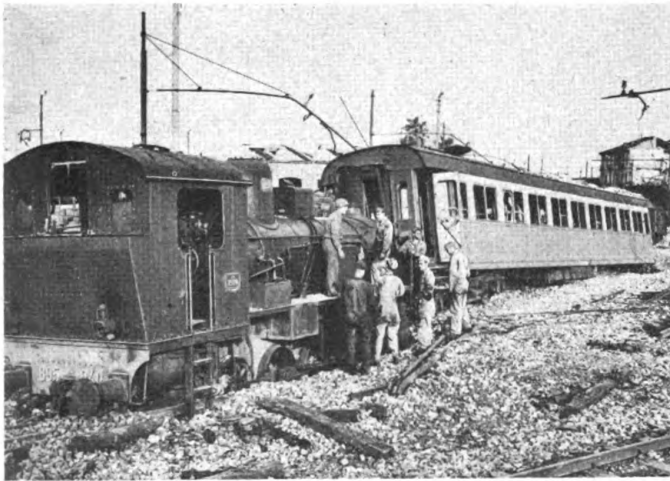
During the course of the war, military railway operations were carried on by United States troops in North Africa, Sicily, Italy, the United Kingdom, France, Belgium, Holland, Germany, Iran, India, Burma, the Philippines, New Caledonia, and Alaska. Altogether, more than 16,000 route miles came under their direct operation, and in addition many railroads which were permitted to continue under foreign management were supervised. The Transportation Corps was responsible for the procurement of equipment for military railways, the

Russian official party greets the first all-American train to arrive at Tehran from the Persian Gulf ports.





The railroad yard at St. Lo in northern France was completely destroyed by Allied bombing and German demolition.



Wreckage found by American military railway troops at Naples.



training of railway troop units, maintenance of way, maintenance of equipment, and the operation of military railway services. The Corps of Engineers was responsible for laying new track and building new structures. The restoration of damaged or destroyed facilities was shared by the two services according to the needs of the occasion.

The Military Railway Service existed during peacetime as part of the Reserve Corps. The units were sponsored by large railroads, which also provided the personnel, but the interest was not active. The first steps toward placing this service on a more active footing were taken in 1939 by the Chief of Engineers, who then had full responsibility for military railways. He appointed two railroad officials as consultants, one to have charge of activities in the field, and the other to be attached to his own office. A general plan of development was evolved, and additional reserve units were organized. In the summer of 1941 the construction of a short railroad for training purposes was begun in Louisiana, and one railway operating battalion was placed in active status. This was substantially the situation on 7 December 1941. Five railway grand divisions, twenty railway operating battalions, and three railway shop battalions were then in reserve status. Gradually, as the need for railroad troops developed in 1942, these reserve units were called to active duty, and a headquarters was established at Fort Snelling, Minnesota.

In the fall of 1942 railroad troops began leaving the United States for overseas service. A detachment was sent to Alaska to bolster operations on the White Pass and Yukon Railroad, and later other troops were assigned to the Alaska Railroad, which was having difficulty meeting wartime requirements. A number of units went to Iran and others to the United Kingdom. Still other units were assigned to North Africa, where the American and British forces landed on 8 November 1942. It was at this juncture that responsibility for the operation of military railways was transferred to the Transportation Corps.

United States military railway units arrived in North Africa, some direct and some via the United Kingdom, within a few days after D-Day. Other units followed shortly. In February the Manager, Military Railway Service, arrived in North Africa with an advance echelon of his headquarters, and very soon he was redesignated Director General. The 1st Military Railway Service, which was then set up in North Africa, continued with the victorious Allied forces into Sicily, Italy, and southern France. In all these invasions small detachments of railway troops crossed the beaches with the assault troops to reconnoiter, begin railway operations where possible, and prepare plans for the disposition of the additional troops and the railway equipment which were to follow.

In North Africa the 1st Military Railway Service operated about 1,400 miles of standard and meter gauge track, extending from Casablanca to Tunis. For the most part the track and

The Germans retreating in Southern France found that wrecking locomotives on bridges caused maximum delay to Allied forces seeking to restore the railroads to usefulness.

equipment were found in fair condition. However, the experience gained in rehabilitating facilities, assembling locomotives and cars received from the United States, and later working under combat conditions in Tunisia, gave the troops valuable experience for the strenuous campaigns in Italy and France, which finally brought some of the units into Germany itself. North Africa also gave the United States Military Railway Service experience in working with the British, which was to prove valuable in nearly two years of joint endeavor in Italy.

Following action by the Combined Chiefs of Staff, the United States Army began taking over operation of the Iranian State Railway from the British in January 1943. As the result of the work of military railway troop units assigned to the Persian Gulf Service Command (later the Persian Gulf Command), and with the aid of American equipment, the 685 miles of track extending from Khorramshahr and Bandar Shahpur to Tehran, soon began to handle increased tonnages. From 47,000 tons which moved northward from the ports in March 1943, the volume increased to 171,000 tons in July 1944. From 1 April 1943 when the United States troops took full operational control of the line, until 1 June 1945 when their responsibility ceased, the 3d Military Railway Service, as it had been designated, moved a total of 4,144,000 long tons of north-bound freight. Of this amount, 2,749,000 tons were lend-lease freight destined to Russia.

American railway troops and equipment sent to the United Kingdom were intended primarily for use on the Continent, but they also served to relieve the manpower and equipment shortages in Britain. The large volume of American military traffic, superimposed upon the abnormally heavy British traffic, placed an unprecedented load upon the British railroads. While being trained for fighting and operating on the Continent, American railway troops assembled locomotives and cars, built and operated tracks at and near United States Army depots, and learned British railroad organization and methods.

Within a week of the assault on Normandy beaches, advance elements of the 2d Military Railway Service landed in France. Using a jeep equipped with flanged wheels, they reconnoitered the rail lines behind the beachheads as soon as the fighting would permit. On 3 July 1944 an advance detachment of an operating battalion arrived in Cherbourg, and by 11 July it was operating the rail line as far as Carentan. The restoration of the tracks and other facilities, and the importation of cars and locomotives, proceeded slowly, but local operations were expanded gradually and on 15 August numerous trains were loaded on the Cherbourg Peninsula and started rolling toward Paris. Thereafter the railroads followed the advance of the forces across France, and on 8 April 1945 the first train of the 2d Military Railway Service crossed the Rhine at Wesel.

The railway equipment moved from the United Kingdom to the Continent immediately following the assault, was transported, fully assembled, in LSTs and train ferries, and on the decks of cargo ships. Rails were laid to LST landing sites so that the rolling stock, some of which had been double-decked in the landing craft, could be drawn directly to the

shore. Including British equipment, 2,016 locomotives were landed on the Continent prior to 1 August 1945, of which 1,546 were American-built 2-8-0 steam locomotives, and 43,841 freight cars were landed, of which 20,725 were 20-ton boxcars and 10,859 were 20-ton gondolas.

In February 1945 the headquarters of the 1st Military Railway Service operating in southern France, and the 2d Military Railway Service operating in northern France, were brought under a single general headquarters, and the Director General of the 1st Military Railway Service was placed in command. Prior to that time, the Director General of the 1st Military Railway Service had reported directly to the Commanding General of the 1st Military Railway Service was placed in command all troop units, controlled the employment of all equipment, and stocked all railway supplies. In contrast, the General Manager of the 2d Military Railway Service had reported to the theater Chief of Transportation, the base section commanders had commanded the military railway units, and track and bridge materials had been stocked by the Corps of Engineers. Each system had good and bad features. The order establishing the general headquarters, made the Director General of the two services responsible to the theater Chief of Transportation, provided that he should have command of all military railway service units, and made him responsible for advance planning, the development and operation of all railroads required for military purposes, the distribution of railway equipment, and the stocking of railway supplies. Thus there was a single head for all military railways in Continental Europe, with authority over both railway troops and equipment. Furthermore, and most important, the military railways were directly under the authority of the theater Chief of Transportation, who was in a position to coordinate their operations with other transportation in the theater.

Following the loss of the Burma Road, the supply line into China was by railway, or by a combination of railway and river facilities, from Calcutta to the Ledo area, thence by air (and later by highway) to Kunming. In order to build up the capacity of the meter gauge portion of the Bengal and Assam Railway, extending 700 miles from Parbatipur to Ledo, this line was placed under American control in March 1944, a railway grand division, five railway operating battalions, and one railway shop battalion were superimposed upon the civilian personnel, and American power and rolling stock were introduced. American equipment to facilitate the transfer of freight from the broad gauge to the meter gauge line at Parbatipur Junction, and to improve the car ferry service at Pandu Ferry, also was provided. Flood control projects were undertaken to prevent interruption of service during the monsoon season. A measure of the improvement in service which took place under American direction is seen in the fact that between March 1944 and May 1945 the volume of United States freight delivered to the Ledo area by rail increased over 300 percent.

Although the Manila Railroad was small compared to the systems of Europe and America, it was important to military operations on Luzon, which was to have been the principal base for the assault on Japan. Railway troops landed at Lingayen



Busy yard on the meter gauge Bengal and Assam Railway, operated by American troops in India.



Mobile repair shop operated by the United States Military Railway Service overseas.

Gulf as soon as the beachhead had been secured, and began restoring tracks and repairing equipment as the Japanese forces retreated. Other troops were added, and a railway grand division took charge on 14 February 1945. By the end of September there were 164 officers, 2,977 enlisted men, and 4,500 native civilians working on the railway lines on Luzon.

The Headquarters, 3rd Military Railway Service, which had been stationed in Iran, and certain other units, began arriving in Japan toward the end of August 1945. The plan then placed in effect was to leave the railway system, which was found essentially intact, under the operational control of the Japanese, but to maintain general oversight of the whole, and to schedule such trains as might be necessary to support the United States forces of occupation.

During the course of the war 2,017 locomotives of all types, 51,294 railway cars of various descriptions, as well as other items of railway rolling stock were sent from the United States to the military railways overseas. These were exclusive of 3,758 locomotives and 32,789 cars delivered to our allies. The locomotives, generally speaking, were shipped assembled. Cars, on the other hand, were shipped in knocked-down condition to save ship space, and were assembled in the theaters. This equipment was constructed to meet the various gauges, weight limits, bumper and brake styles found in the countries where it was to be used. It was employed to supplement local equipment which was found intact or in repairable condition. Even in a country such as France, where the Allied air attack and the enemy forces had done an especially thorough job at destroying railway equipment, large numbers of locomotives and cars were quickly placed in serviceable condition by American railway troops aided by French civilian workers.

On 30 June 1945 the total personnel of the Military Railway Service was 1,966 officers and 41,340 enlisted men. Of this total, 1,163 officers and 25,275 enlisted men—more than

60 percent—were stationed in France, Belgium, Holland, and Germany. Of the remainder, 604 officers and 11,390 enlisted men were in other oversea areas, 118 officers and 3,129 enlisted men were being returned to the United States for redeployment, and 81 officers and 1,546 enlisted men were in training in the zone of interior. On the whole, the Military Railway Service was somewhat over authorized strength in officers, and somewhat under authorized strength in enlisted men.

The organization of the Military Railway Service followed closely the orthodox lines. The headquarters corresponded to the office of the operating vice president of an American railroad. The railway grand division was set up and functioned similarly to a general superintendent's office. The railway operating battalion corresponded to a division superintendent's organization, and the railway shop battalion was in effect a joint locomotive and car shop. The fact that the commissioned officers and enlisted personnel of the units consisted largely of experienced railway men and that most of the units had been technically trained by large American railroads under actual operating conditions, accounted in a large degree for their proficiency and excellent morale. The results which they achieved overseas won enthusiastic praise from the Army commanders under whom they served.

The military railways naturally made the fullest possible use of the services of native railroad officials and workers. Their knowledge of facilities and methods, and their sheer manpower were of the greatest value. Yet in many instances, when taking over railways in recently captured areas, American railway troops were forced to rely for a time entirely on their own skill and ingenuity.

The Rail Division in the Office of the Chief of Transportation served as rear echelon for the organizations overseas. On the basis of information received from the field, it established

the military characteristics of railway equipment, determined the organization of military railway units, and collaborated with the Military Training Division in developing appropriate technical training methods. The Rail Division also provided an inspection service to determine the progress and readiness of units in training.

Highway Transport

The conception of a motor transport service, nontactical in purpose and paralleling the military railway service, had not been sufficiently developed at the beginning of the war. Over-the-road motor transportation had not played a sufficiently heavy role in World War I to establish firmly the need and the importance of such a service. Between the wars the attention of the military planners and technicians had been directed primarily at organizational motor vehicles. The tendency during that period was to regard the 2½-ton standard Army truck as adequate for all general-purpose hauling, notwithstanding the fact that the vehicle was designed primarily for off-road mobility and performance.

Motor transport experts in the Highway Division of the Office of the Chief of Transportation began in 1942 to point out the need for trucks of larger capacity and more suitable characteristics, for employment in oversea areas where good highways were available. Basically, it was argued that trucks of larger capacity would transport the same amount of freight with fewer vehicles, less personnel and less highway congestion than if smaller units were used. Furthermore, tractor-trailer combinations were more economical than truck units from an operational standpoint for most base area and line of communication hauling. Some time was required for the propagation of this idea, and production bottlenecks further delayed the availability of the proposed equipment.

Meantime, the Chief of Transportation had undertaken to obtain authority to load organizational vehicles engaged in over-the-road operations heavier than their off-road rated capacities. This authority was obtained in May 1944 for all general-purpose wheel-drive vehicles up to and including the 2½-ton truck, and later it was extended to larger vehicles. Thus, for example, it became permissible to transport 5 tons on a 2½-ton truck, which was entirely feasible under reasonably good road conditions. War Department approval was given also to the use of driver augmentation teams to insure continuous operation of the vehicles assigned to a truck company.

Highway transportation in the North African campaign was largely dependent upon organizational equipment. The control of motor transport was in the respective base sections. Coordination was effected by the Office of the Chief of Transportation, Allied Force Headquarters, but a Highway Division was not set up in that headquarters until after victory had been won in Tunisia. A shortage of motor transport existed from the beginning, and was keenly felt as the campaign developed and the lines of communication became longer. In January 1943, an urgent call was received from the theater for 5,000 2½-ton trucks, as well as cargo trailers and dump

trucks, and this equipment was forwarded with utmost dispatch. The situation in North Africa necessitated the use of as much native equipment as could be hired, including some large charcoal burners.

There was a shortage of vehicles in Sicily, also, and delay in providing the necessary truck personnel. Furthermore, the Highway Division in G-4, Seventh Army, was not fully established on the island until late in July 1943. During the ensuing period, however, the division successfully undertook to coordinate the use of vehicles and the supply of drivers, and to supervise the movement of vehicles in the interest of order on the highways and speedy delivery of matériel.

Highway transportation took on special significance in the Italian campaign, because of the heavy damage suffered by the railways. In recognition of this, the Fifth Army established the first special staff section for transportation in a field army. In the early stages there was a persistent lack of both vehicles and truck companies in the Peninsular Base Section. Heavy drafts upon stocks in North Africa and importations from the United States gradually alleviated the vehicle shortage. By using Italian Service Units and converting some combat units into truck companies, the driver shortage also was mitigated. In the summer of 1944, 10-ton tractor-trailer combinations began arriving in the theater, followed by 22-ton low-bed semitrailers which had been designed in the Office of the Chief of Transportation especially for port clearance.

The motor transport of the United States forces in Italy was under the control of the Peninsular Base Section, and movements between American and British areas were coordinated by the Allied Armies in Italy, Administrative Echelon, and in the rear areas by Allied Forces Headquarters after its removal from Algiers to Caserta. Despite many handicaps, Transportation Corps highway officers in Italy established a notable record in the operation of equipment and the control of movements. For example, motor transport under the Transportation Section, Fifth Army, moved a daily average of more than 5,000 tons in support of combat elements.

The potentialities of motor transport were fully realized in the invasion of France and the drive into Germany. As at Naples, so at Cherbourg and Marseilles, trucks proved their indispensability in the clearance of ports and beaches. Again, their flexibility made them highly serviceable in establishing and operating supply lines to support fast-moving forces. Later, in the advance beyond the Rhine, long motor hauls were made before and after the restoration of railway operations. Unlike tracks and other railway facilities, the highways were little damaged by bombing, and when damaged they could be more quickly repaired.

The long preinvasion planning and build-up period in the United Kingdom was utilized to assemble equipment, train personnel for operations in combat areas, and create additional truck companies out of troops of many services. A Motor Transport Division was established. A project calling for 8,000 10-ton trailers and 5,000 tractors was submitted by the theater Chief of Transportation in August 1943, and although War Department approval was delayed, a large part of this equipment reached Europe during the summer and fall of 1944.

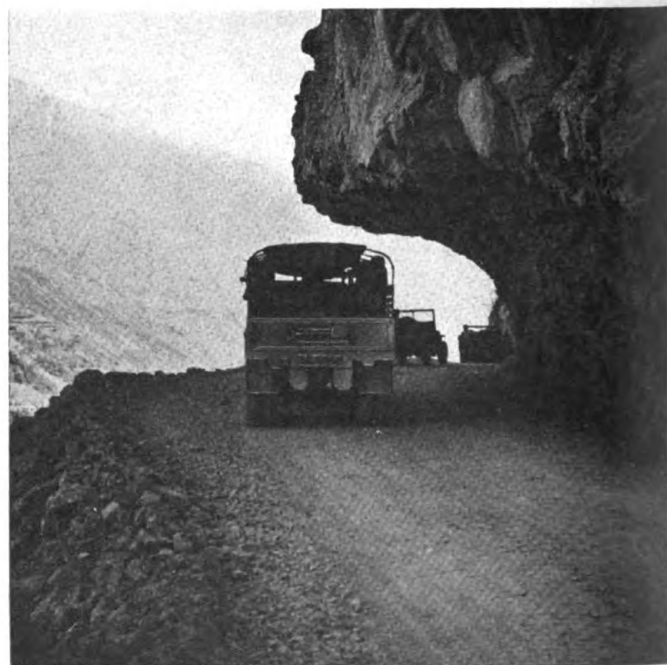


Section of the highway in Iran over which lend-lease supplies were moved into Russia.

Among the accomplishments of the Motor Transport Service on the Continent, several stand out as especially indicative of the potentialities of highway transportation in the support of rapidly moving forces. Following the break-through at St. Lo and the rapid sweep of the Armies in the direction of Paris, the Red Ball Express service was established in August 1944, and it delivered more than 400,000 long tons of freight in less than three months. Following the opening of Antwerp to Allied vessels in November 1944, the ABC motor route was placed in operation, and it carried about 250,000 tons of freight into the forward areas prior to its closing late in March 1945. During the critical period when the German counteroffensive was being repulsed in the Ardennes, motor equipment under the control of the theater Chief of Transportation moved 90,000 troops and 1,000,000 tons of supplies in support of the combat forces. The XYZ route was set up in March 1945, specifically to supply the four armies then advancing into Germany, and in a period of six weeks it moved forward a total of 630,000 tons. The POL Truck Fleet, consisting of tank trucks ranging from 750 to 3,000 gallons capacity, began operations in the middle of June 1944, and up to the end of February 1945 had carried more than 460,000 tons of gasoline and oil from the pipeheads to the Armies. The Penguin Fleet of refrigerator trucks delivered perishables from the ports to the forward cold storage depots. One of the more spectacular performances of the Motor Transport Service was the movement of a fleet of landing craft and marine tractors, on borrowed tank transporters, from Antwerp to the Rhine for use in crossing that stream.



Trucks of the Highway Transport Service crossing the Rhine with supplies for the Seventh Army.



First convoy passes over the Ledo Road, built by the United States Army to restore a highway supply line into China.

In southern France the rapid advance of the Allied forces quickly created a shortage of motor transport. In order to meet target figures for supplying the United States Seventh Army, it was necessary to divert trucks and truck companies from northern France. In southern France the commanding officer of the Sixth Port, which then was stationed at Marseilles, was designated also transportation officer of the base section which had its headquarters there. In this dual capacity he endeavored to coordinate port clearance by motor vehicle and over-the-road movements.

Operational control of motor movements within the base sections in the European Theater of Operations was under the base section commanders. This was somewhat of a handicap in the beginning, notwithstanding the fact that control of intersectional movements was placed in the Motor Transport Service. Later a system of coordination was worked out which largely removed this handicap. Technical supervision of highway operations was in all cases under the Motor Transport Service.

A Motor Transport Service was organized in the United States in October 1942, for the purpose of operating trucks between the Iranian ports at the head of the Persian Gulf and Kazvin, a distance of about 650 miles, to deliver lend-lease supplies to the Russians. By commissioning a number of experienced truck fleet operators and maintenance men, and enlisting experienced truck drivers, the Motor Transport Service was sufficiently organized and equipped by March 1943 to begin service, as an element of the Persian Gulf Service Command. Many natives were trained to drive the vehicles

of the American fleet, which shuttled back and forth. Up to 30 November 1944, when its work was finished, the Motor Transport Service hauled 624,000 tons of freight, of which about two-thirds were lend-lease supplies for Russia.

Trucks which were to be delivered to the USSR under lend-lease were turned over to Russian drivers at Khorramshahr and Andimeshk, where there were assembly plants, and driven by them, with lend-lease cargoes, through to the Soviet Union.

The most significant highway operation in the India-Burma Theater was the forwarding of vehicles and freight to Kunming, China, over the Stilwell Road. The building of the highway from Ledo to connect with the Burma Road afforded the only surface route into China from the west, as long as lower Burma remained in Japanese hands. The first convoy left Ledo on 4 February 1945, and during that month 22 convoys were dispatched, totaling 2,170 vehicles. By the end of August a total of 122,744 gross cargo tons had been delivered in Kunming. A great variety of vehicles was included in these convoys, with 2½-ton trucks predominating. The Highway Division of the Office of the Chief of Transportation, ASF, assisted in developing a vehicle especially adapted to the poor surfaces and hairpin curves of the Stilwell Road, but this equipment had not been approved by the War Department when hostilities ceased.

Although the need for suitable motor equipment for over-the-road operations in the theaters has been recognized, and the Chief of Transportation, ASF, has established his position as the technical service to forecast requirements and develop designs, the training of truck companies remains outside his jurisdiction.



Motor transport mired in the mud on Okinawa after heavy rains.



Trucks of the Red Ball Express refuel along the route in Northern France.



River craft were employed in the supply of air bases in China, due to deficiencies of rail and highway transport.



The Albert Canal in Belgium was an important factor in supplying the Allied forces advancing into Germany.

tion. Such units have been trained by the Army Ground Forces and the Army Air Forces principally, and this training has been based primarily on organizational requirements. The development of doctrine and the training of personnel for the motor transport services should be a responsibility of the Chief of Transportation, who is in the best position to coordinate training with technical and operational needs.

Inland Waterways

Wherever inland waterways were available they were utilized, for in that way the burden upon the railways and the highways was lightened. In Iran an organization known as the British Inland Water Transport Agency was utilized to move United States Army and lend-lease supplies from the port of Khorramshahr up the Karun River to Ahwaz, where they were transferred to the railway. In China, where other means of transportation were extremely scarce, all available local craft were employed to move military supplies on the rivers. For example, junks, sampans, and small river steamers were utilized to move approximately 6,000 tons of supplies on the Yangtze River during the month of August 1945.

In India an organization known as the American Barge Lines was established under the control of the Transportation Service of the China-Burma-India Theater (later the India-Burma Theater). Its primary purpose was to carry gasoline and other petroleum products from Goalunda to Dacca, whence the cargo was distributed to the East Bengal airfields. The American Barge Lines also carried dry cargo from Khulna to Dacca, and performed harbor service in the Calcutta area. Two Transportation Corps harbor craft companies were used in this operation, supplemented by native personnel. Both power and barges were imported from the United States. The marine tractors, or "sea mules," which were used initially,

were inadequate when the traffic increased, and seven 850 hp Diesel tugs were obtained from the United States.

In the European Theater of Operations the principal inland waterway routes were the Seine River from Rouen to Paris, and the Albert Canal between Antwerp and Liege. In November 1944 an Inland Waterways Division was set up in the office of the theater Chief of Transportation, to supplement an Inland Waterway Committee which had been created earlier by the Communications Zone. The division's mission was to assist French, Belgian, and Dutch agencies to get their systems in operation again, insure that the American equipment and materials used to repair canals and locks were employed to best advantage, and coordinate the utilization of the waterways for Army traffic to avoid delays. The plan was to allow the respective countries to operate their own canal and river systems, but to aid them in every way possible.

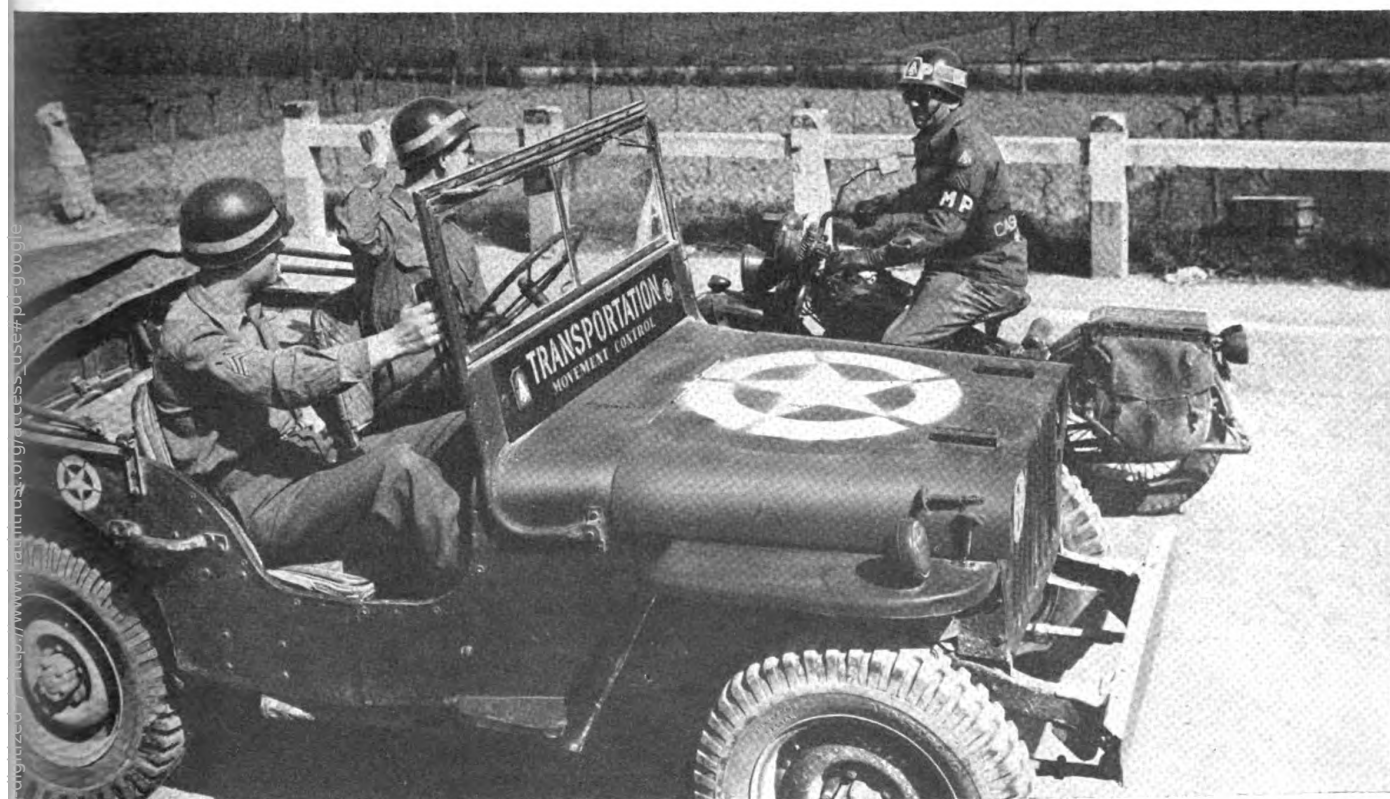
Due to the extensive damage to locks and obstructions created by blasted bridges, as well as the extremely cold weather which characterized the European winter of 1944-45, progress in bringing the inland waterways into active use was slow, but by spring a good volume was moving. Between December and April the Army freight loaded at Rouen increased from 13,525 to 100,786 tons, and that loaded at Antwerp from 50,172 to 148,926 tons. During April, Ghent loaded 80,490 tons and LeHavre 17,250 tons.

The Inland Waterways Division installed port companies at inland ports to discharge cargoes; secured barges, tugs, and some landing craft to supplement local equipment; arranged for the Corps of Engineers to do some reconstruction work; provided clothing to keep the barge operators warm; established canal patrols; and expedited movements when necessary. During the early months of 1945 the division also was making plans for utilization of the inland waterways of Germany following the cessation of hostilities.



Drums of gasoline being formed into rafts for floating down the Tanana and Yukon Rivers in Alaska.

Movement control officer and the military police exchange information on a highway in Italy.



Regulating Functions

When the American forces arrived in the United Kingdom they found a well-established British Army institution, commonly designated RTO (Railway Traffic Officer). The RTO's were stationed at all traffic centers of any importance, and they dealt with every problem of movement, whether it was expediting a train of military supplies or finding a bed for a casual soldier. Subsequently, these initials were used to identify regulating officers of the United States Army stationed at points where heavy traffic of any nature had to be controlled.

The RTO's with the United States Army were members of traffic regulating teams, and these in turn were elements of traffic regulation groups which were activated and trained by the Chief of Transportation, ASF, for service in the theaters. A traffic regulation group was made up of 16 teams, each team composed of one officer and four enlisted men. The units were assigned to the transportation officers of base, intermediate and advance sections, and usually one or more teams were attached to the section headquarters, while the others were stationed at points where there was railway, highway, waterway, or air traffic to be regulated. The types of teams composing traffic regulation groups varied according to the kinds of traffic handled in the sections to which the groups were assigned. Experience in the North African campaign was helpful in revealing the extent and the nature of the problems to be dealt with.

The regulation of air and pipeline traffic involved means of transportation which, unlike the railways, highways, and waterways, were not under the control of the theater Chief of Transportation or Chief Transportation Officer. Air movements were handled by the Air Transport Command, and pipelines were installed and operated by the Corps of Engineers. Nevertheless, these were alternatives to the means of transportation which were under the theater Chief of Transportation, and the traffic which they handled generally was transshipped to or from railways, highways, or waterways.

The interest of the Chief of Transportation, therefore, was very direct.

The volume of air-borne nontactical traffic was on the increase throughout the war. Pipeline traffic also was of growing importance. Pipelines to inland airfields were extensively employed first in North Africa and later in Italy. Twenty lines of pipe were laid under the English Channel soon after D-Day, and as the forces advanced inland pipeline deliveries followed them all the way to the Rhine. In India there were pipeline connections from Calcutta and Chittagong to the Ledo area, thence into China. Local pipeline systems were installed at the important bases in the Pacific.

The responsibility of the theater Chief of Transportation in regard to air and pipeline traffic varied widely as between the several areas. Sometimes movement control was vested in other offices, or in joint agencies on which the Chief of Transportation had representation. Unquestionably the theater Chief of Transportation should have clear authority to control nontactical intratheater movements by these means.

Handling of Supplies

The handling of Transportation Corps supply overseas was another of the matters which the North African campaign brought to a focus. The need for special troop units for the operation of depots was soon felt and a request for such unit was received from the theater in January 1943. The first table of organization was drawn up for a Transportation Corps Base Depot Company to handle military railway supplies. This was not adequate, since port and marine supplies also had to be stocked and issued. Accordingly, a revised table of organization was prepared to cover the broader field.

In the theaters, Transportation Corps depots were located either at general depots or at smaller depots. In providing for the latter, base depot companies usually were split up into detachments. Where the depot activities were quite small, a warehouse team of a Transportation Corps service organization was called upon to take charge.

TRANSPORTATION CORPS SUPPLY

Transportation Corps supply, like many of its other activities, suffered severely from the fact that the Corps was not established and its procurement responsibilities determined until well after the country had been plunged into war. The lack of experienced personnel, settled organization, and tested methods were basic handicaps which had to be overcome. There were no technical manuals, supply catalogs, spare parts lists or standard nomenclature. Estimates of requirements, approved programs, and production schedules were unrealistic in some respects. There were no depots for Transportation Corps matériel. Procurement functions were scattered among several headquarters divisions and the field installations, with resulting lack of standardization and coordination. The heavy burden which the war imposed upon the well-established services, was multiplied in the case of the Transportation Corps because of its newness.

When, in the Army reorganization of March 1942, the first step toward an integrated transportation service was taken, the procurement responsibility of the new Chief of Transportation included only ships, harbor boats, and other floating equipment. This responsibility was committed to the Water Division in the Office of the Chief of Transportation. Soon it was agreed that vessels over 1,000 gross tons, and all used vessels of lesser tonnage, would be procured for the Army by the War Shipping Administration. However, the demand for the construction of many types of small boats grew so rapidly that a considerable expansion of the procurement staff was necessary. In July 1942, a Requirements and Procurement Division was established, and in October of the same year an Assistant Chief of Transportation for Supply was designated.

In November 1942, responsibility for the procurement of military railway equipment was transferred to the Transportation Corps from the Corps of Engineers. With this large addition, and the definition of his responsibility regarding materials handling equipment and miscellaneous supplies related to transportation, the procurement function of the Chief of Transportation was virtually stabilized—one year after our entry into the war.

The procurement of marine equipment involved the construction of vessels ranging from 16-foot swamp gliders for the Army Air Forces to 190-foot mine planters for the Coast Artillery Corps. In between there was a variety of tugs,

launches, barges, lighters, tankers, and freighters, designed and equipped for many types of service in many parts of the world. The procurement of railway equipment covered various types of steam, Diesel, and electric locomotives, many types and sizes of railway cars, locomotive cranes and other rolling stock, all adapted to the requirements of the foreign and domestic railroads upon which they were to be used. Altogether there were 158 different types and sizes of floating equipment, 224 different types and sizes of railway equipment, and more than 50,000 different items of replacement parts and expendable supplies.

The Supply Program

The annual budget estimates for Transportation Corps supply reflected the anticipated requirements. In a war of such proportions, and with strategical plans repeatedly taking on new aspects, long-range forecasts of overseas requirements necessarily were subject to revision, and sometimes wide revision. Broadly speaking, the program was designed first to provide adequate equipment for the invasion of Continental Europe and the limited war in the Pacific, and after VE-Day to provide such additional equipment as the final drive against Japan might require. The peak budget estimate was \$1,196,161,000 for the fiscal year 1944, which was more than four times as large as the estimate for 1942.

VE-Day brought a reduction (in dollar value) of less than 1 percent in the procurement schedule for the calendar year 1945, and an increase of more than 25 percent in the schedule for 1946. The increase for 1946 was due only in part to Army requirements, since the end of the war in Europe brought a substantial increment in the requirements of equipment (principally railway items) for shipment to foreign countries under the auspices of the Foreign Economic Administration. The greater requirements of FEA as agent for various foreign governments more than offset the reduced requirements under lend-lease. Following VJ-Day, procurement for the Army was virtually cut off, except as regards replacement parts and supplies to keep existing equipment in operation, but FEA requirements remained substantial.

Requirements for equipment procured by the Transportation Corps, as estimated by the overseas commanders, Transportation Corps installations in the zone of interior, and other

Table IX. Budget estimates for Transportation Corps equipment and supplies for the fiscal years 1942 through 1946, as originally submitted to Congress

Fiscal year	Total estimate	Marine equipment	Railway equipment	Materials handling equipment	Miscellaneous supplies
1942.....	\$256,561,543	\$101,439,000	\$147,436,682		\$7,685,861
1943.....	713,062,511	306,442,600	224,469,643	\$69,612,575	112,537,693
1944.....	1,196,161,131	518,923,500	345,869,077	87,968,400	243,400,154
1945.....	733,788,570	124,586,500	230,669,235	66,327,995	312,204,840
1946.....	294,131,250	56,045,100	49,385,000	10,645,190	178,055,960
Total.....	3,193,705,005	1,107,436,700	997,829,637	234,554,160	853,884,508

NOTE: This tabulation includes estimates for marine equipment prepared by the Quartermaster Corps for the fiscal year 1942 and estimates for rail equipment prepared by the Corps of Engineers for the fiscal years 1942 and 1943, before the procurement of such equipment was transferred to the Transportation Corps. The estimates cover equipment and supplies procured by other agencies (e. g., Navy, Maritime Commission, Ordnance Department) for the account of the Transportation Corps, as well as that procured by the Transportation Corps directly.

services and commands using such equipment, were reviewed by the operating divisions in the Office of the Chief of Transportation which were most familiar with the respective items, before they were acted upon by the Requirements Division. Estimates of future requirements were obtained twice each year from all prospective users, and these formed the basis of the Transportation Corps supply program, which after approval by the Requirements Division, Army Service Forces, became a part of the Army Supply Program. Naturally, it was necessary to process many new requests in the course of the year, and cutbacks in approved programs frequently were necessary to bring them in line with changed conditions.

In the beginning, great difficulty was experienced with theater requirements for operational supplies, that is, equipment and other matériel in excess of authorized allowances, needed for assault or other military operations. The Transportation Corps was especially affected, since it was new and had not had time to build up stockpiles. Theater commanders, moreover, were less experienced in estimating their needs for transportation equipment than for strictly military supplies. The operational project system, which was introduced in the summer of 1943, was therefore of great importance to the Chief of Transportation and his assistant for supply.

Operational projects were of two types. War Department projects included long-range estimates for forthcoming operations directed by the War Department. Theater projects covered equipment and supplies required for operations planned in the theaters. Estimates of requirements made when the operations were projected formed a much better basis for the procurement program than sporadic requests received from time to time. More than 75 projects were submitted, which included transportation equipment. The first major project of this nature, submitted by the European Theater of Operations in August 1943, included the estimated requirements of floating equipment for the operation of four major and eight medium ports, with a daily discharge capacity of 40,000 long tons, which were part of the plan for the invasion of France. The project was augmented later, but the original request, when approved by the War Department, was of great aid to the Chief of Transportation in contracting for and scheduling the production of equipment needed almost a year later.

As has been indicated, the Transportation Corps, in addition to procurement for the United States Army, had responsibility for supplying marine and railway equipment to other nations under the Lend-Lease Act and under other authority vested in the Foreign Economic Administration. Foreign requisitions, approved by the appropriate authorities, were processed by the International Division in the Office of the Chief of Transportation, which also coordinated the shipment of such supplies up to the time they were loaded on the ships. During the fiscal year 1944 Transportation Corps equipment valued at \$131,155,747 was transferred to other countries. The corresponding figure for the fiscal year 1945 was \$258,724,355. Of the latter figure, \$195,084,121 represented equipment destined to Russia, and \$57,843,803 equipment destined to the United Kingdom. The break-down by type was as follows:

Rail equipment and supplies.....	\$229,752,652
Marine equipment.....	20,446,755
Other equipment.....	8,524,948
Total.....	\$258,724,355

Purchasing Practices

All procurement of supplies for the Transportation Corps was under the control of the Director of Supply (at different times designated Assistant Chief of Transportation for Supply and Director of Matériel and Supply) in the Office of the Chief of Transportation. His instructions were to decentralize the work of negotiating and administering contracts to the greatest extent consistent with efficiency and economy. Accordingly, although contracts for major end items were negotiated by the Procurement Division of the Office of the Chief of Transportation, located in Cincinnati, Ohio, they were administered by supply officers in the field. Negotiations for other items were conducted by contracting officers in the field procurement offices and other field installations, under the supervision of the Procurement Division. The contracting officers in the field were authorized to make emergency purchases independently of the Procurement Division, within

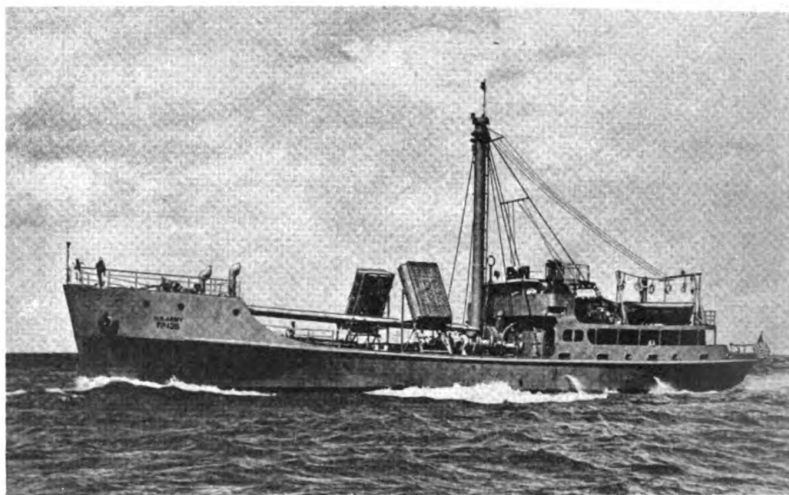
specified cost limitations. Contracts involving \$500,000 or more, wherever negotiated, required approval of the Contract Award Board in the Office of the Chief of Transportation.

The first move in the direction of decentralizing supply activities was taken in October 1942, when five procurement offices were authorized. This arrangement was superseded when supply divisions were set up in the nine transportation zones which were created in December 1942. Toward the end of the war, in the spring of 1945, it was found feasible to reduce the number of field procurement offices to four, located in New York, Chicago, New Orleans, and San Francisco.

Under the First War Powers Act and Executive Order No. 9001, all contracts and purchases were made by negotiation, rather than by the sealed bid procedure. Contracting officers were authorized to use any methods of negotiation which in their opinion would result in the efficient and expeditious award of contracts. All contracts, however, were consummated according to standard War Department forms or approved Transportation Corps forms. To facilitate negotiating and contracting, the field procurement offices maintained lists of manufacturers and dealers previously used, with information as to plant capacity, financial resources, past production record, and related subjects. Each new manufacturer seeking business was investigated so that his potentialities could be properly cataloged.

Contracting officers were directed to take certain factors into consideration in letting contracts. An effort was to be made to have, for each item of supply, two contractors so located as not to be subject to the same hazard to uninterrupted production. Placement of contracts in labor shortage areas, as determined by the War Manpower Commission, was to be avoided so far as possible. Contracts with firms listed as violators of the Walsh-Healy and Davis-Bacon Acts were to be avoided. The greatest practicable volume of prime contracts was to be placed with so-called small war plants (employing less than 500 persons), and the larger prime contractors were to be encouraged to subcontract to such small concerns. Price analyses were made of all items procured, and comparative price records and indices were prepared and furnished to contracting officers. When price analysis revealed that the prices of comparable items were out of line, the higher priced contractor was required to submit a break-down of production costs. If the difference in prices was not found justifiable on that basis, or by existing Government policies, negotiations for appropriate adjustments were undertaken. Price changes were reviewed to determine reasonableness. Even packaging costs were reviewed to determine the fairness of the manufacturers' charges for that service. The index of contract price changes, based on October 1942 as 100, rose to a peak of 102.4 in November 1942, and thereafter showed gradual downward trend. In June 1945 the index figure was 93.8.

35-foot rescue boat procured by the Transportation Corps for the Army Air Forces.



168-foot steel supply vessel designed and procured by the Transportation Corps for coastwise and interisland service.



143-foot Diesel electric tug used extensively overseas.



The use of smaller war plants was so essential to maximum production that the policy of close pricing was relaxed somewhat in their favor. Contracting officers were instructed that if higher prices for end products were necessary to bring about the placement of business with small plants, as either prime or sub-contractors, this was allowable when price analysis showed that the higher prices were proper and the payment of the higher price was justified by the added production. During the heavy production year of 1944, 91 percent (by value) of Transportation Corps contracts which were suitable for award to small war plants were awarded to such plants.

Procurement Problems

The fact that the Transportation Corps' heavy program for marine equipment was not launched until the summer of 1942, involved certain serious handicaps. The chief difficulty arose from the fact that the larger and better boat building plants by that time had been completely committed under Navy and Maritime Commission contracts. Although there were a few adequate plants which could be utilized, it was necessary to deal with many which were poorly equipped and organized. These smaller and newer boat building concerns also were confronted with the extremely serious problem of finding the machinery and materials with which to fulfill their contracts.

A basic step in the solution of this problem was taken when an agreement was made with the Navy and the Maritime Commission regarding the utilization of shipyards and engine building plants. Lists were prepared of the concerns which had facilities for the construction of the various types of vessels

and engines, and certain of them were designated for the exclusive use of each agency. To rationalize the procurement of replacement parts for internal combustion engines, the Transportation Corps and the Navy's Bureau of Ships established a plan under which each would stock certain items for its own and the other's needs. The controlled materials plan, which was placed in effect toward the end of 1942, assured each agency a supply of the available critical materials in proportion to its approved construction program.

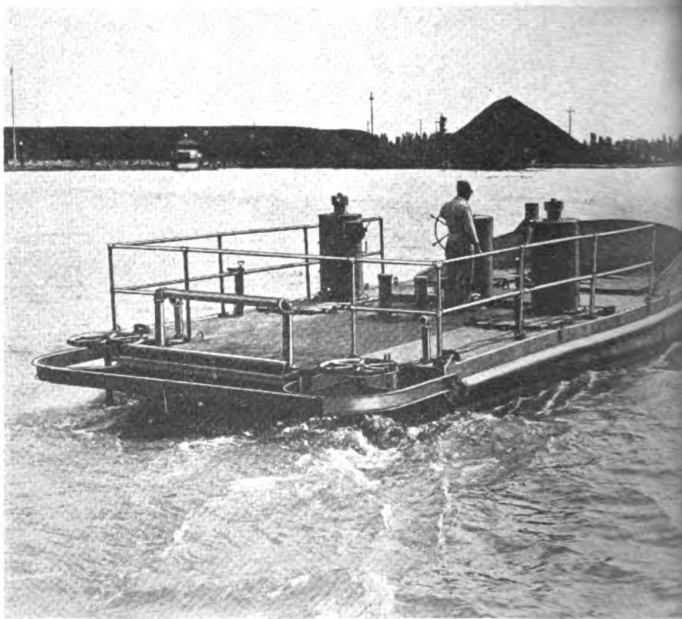
When the need for increased production dictated that a contractor's facilities be enlarged, the Transportation Corps initiated the action necessary to provide Government assistance in that direction. If the need was for a new or expanded plant, funds for the purpose could be provided by the Defense Plant Corporation, upon certification that the facilities were essential to the war effort. Nine concerns were certified by the Transportation Corps for such aid. When the plant was adequate but there was need for additional machine tools, these were provided by the Transportation Corps on a rental basis. Thirty-two contractors were aided in this way. When a contractor could be induced to increase his facilities at his own expense provided payments were advanced on his contract, this was done. The established ability and reliability of the contractor, and a definite need for the increased production capacity, were prerequisites to any of these arrangements.

A nation-wide survey showed that whereas some contractors were handicapped by a lack of tools and machinery, and were unable to procure more, such equipment was sometimes idle at other plants. The Ordnance Department, which was charged with the responsibility of procuring machine tools required by all branches of the Army for leasing to contractors,

27-foot wooden patrol boat for river and harbor use.



Motor-propelled marine tractor, or "sea mule," extensively used for power in sheltered waters.





Motor towing launches in wet storage at the Los Angeles Port of Embarkation.

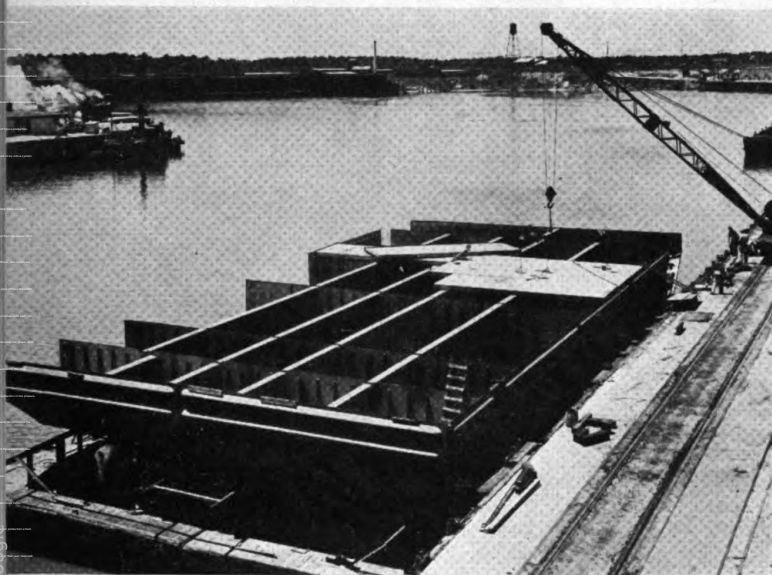
prepared an inventory of surplus equipment, and when items listed were those required by Transportation Corps contractors, arrangements for transfer were made. A corresponding effort was made to prevent stocks of critical materials from building up at certain plants while others were handicapped by shortages.

Labor supply became a progressively difficult problem as Selective Service took more and more manpower from industrial occupations. The small plants producing marine equipment for the Transportation Corps were especially affected, because the loss of a few skilled men was more severely felt. The industrial personnel officers in the transportation zones worked closely with the contractors, the Selective Service Boards, the War Manpower Commission, and local industrial committees to alleviate this condition. In line with War Department

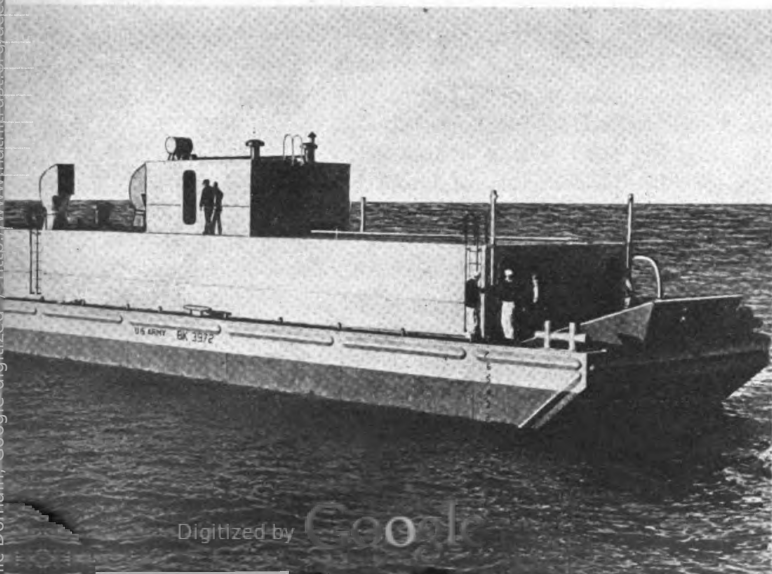
policy, contractors were urged to grant equal opportunities to all loyal and qualified workers regardless of national origin or citizenship. Prime contractors were urged to avoid tight labor markets in placing subcontracts. From May 1942 it was unnecessary to include in contracts for railway equipment the representations and stipulations required by the Walsh-Healy Act, and in March 1943 this exemption was extended by the Secretary of Labor to the shipbuilding and ship repairing industries. In order to cover increased production costs resulting from compliance with the 48-hour work week order, contracting officers were authorized, under specified conditions, to enter into supplemental agreements granting contractors additional compensation. A nation-wide system of reporting actual and threatened industrial disputes, which might affect Transportation Corps contracts, was instituted,



Panels of a 112-foot bolted sectional steel barge loaded on railroad cars.



Sectional Barge being assembled.



Refrigerator barge built for use at Pacific bases.

and actions were initiated to forestall or relieve work stoppages.

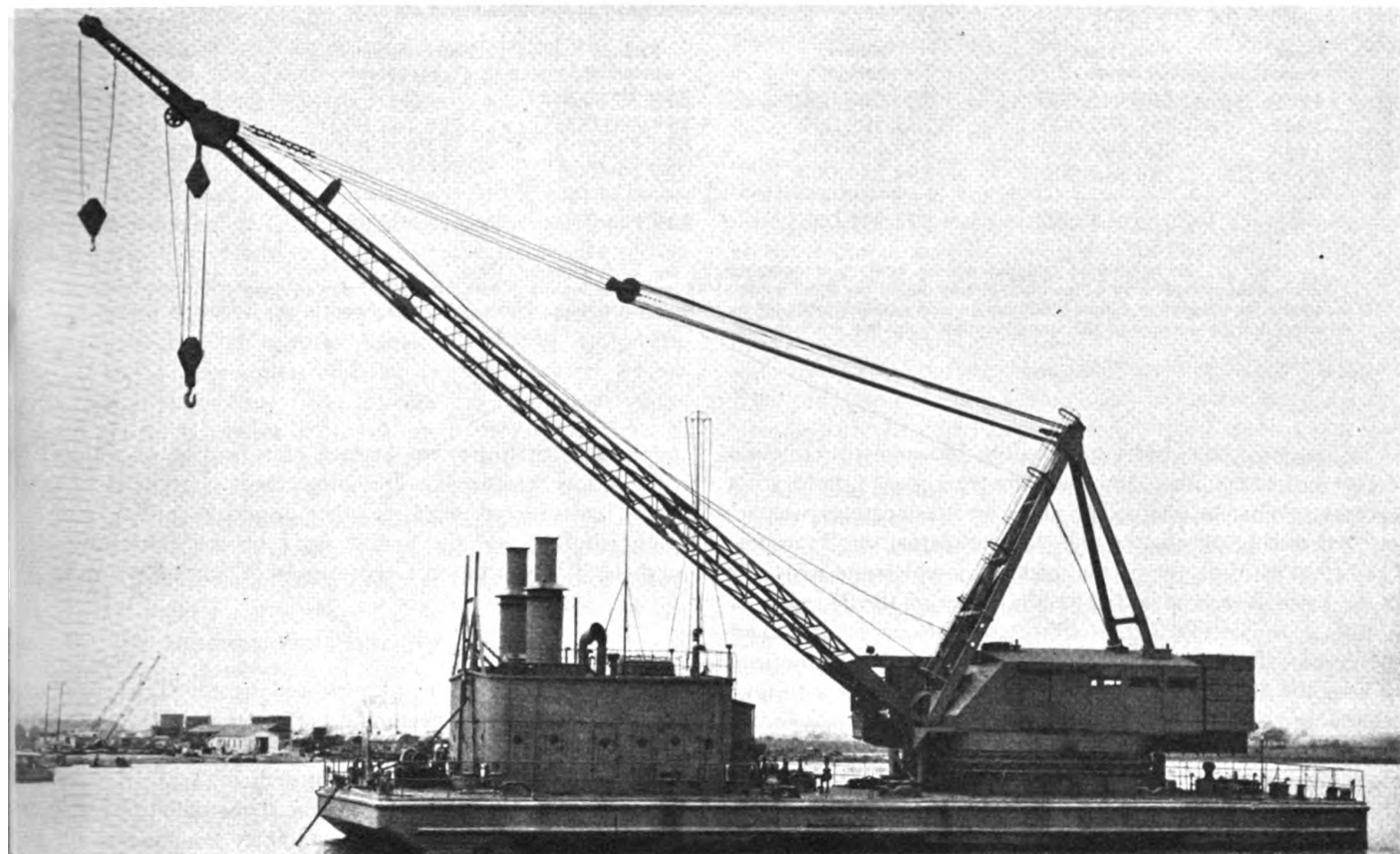
The procurement problems which have been outlined affected principally contracts for marine equipment and supplies. The builders of locomotives and railway cars were older and larger concerns, with more adequate facilities and more stabilized personnel. Nevertheless, the shortage of skilled workmen affected production in some instances, particularly the production of Diesel locomotives, and a number of plants which were building railway cars were affected by short strikes.

Production Controls

After preference ratings and the production requirements plan had failed to solve the problems created by critical shortages of essential materials, the controlled materials plan was introduced late in 1942, under the management of the War Production Board. This plan was predicated upon a prior determination of the supplies which were essential to the war effort, and an allocation of controlled materials in such a way as to enable the largest possible quantity of those supplies to be manufactured. Allocations of materials were made quarterly, and the estimates of requirements which the claimant agencies were obliged to submit in advance of receiving allocations, necessitated a careful analysis of future production. Thus the controlled materials plan fitted nicely into a system for production control.

In the beginning, allotments of controlled materials were made directly to prime contractors, but from December 1943 they were made to the zone supply officers, who in turn distributed them to the contractors. The zone officers thereafter were responsible for maintaining close contact with each contractor to determine whether he had received the proper allotment and to make any necessary adjustments. The zone officers also worked closely with the contractors in the preparation of realistic estimates of requirements for controlled materials, since obviously the accuracy of these estimates was basic to the effective working of the plan.

Production scheduling of Transportation Corps items improved gradually during 1943. The master production schedule, which was introduced in November of that year, required that careful estimates be made monthly of deliveries of all major and secondary end items during succeeding months, and these estimates were set off against the requirements of the supply program. If the forecasted production of an item ran behind the program requirement, explanations were sought and adjustments worked out. When the demand for marine spare parts became especially heavy during the late summer of 1944, zone supply officers were required to submit weekly teletype reports concerning the progress of each contract. A monthly report of production difficulties was rendered to the Director of Production Scheduling, Army Service Forces, which stated the causes of delayed production and indicated the measures that should be taken.



60-ton revolving floating crane.

Locomotive crane procured by the Transportation Corps.



Table X. Value of Transportation Corps equipment and supplies completed and accepted during the fiscal years 1942 through 1945

Fiscal year	Total value	Marine equipment	Railway equipment	Materials handling equipment	Miscellaneous supplies
1942....	\$69,946,000	\$34,368,000	\$18,729,000		\$16,849,000
1943....	367,809,000	133,592,000	155,300,000	\$2,167,000	76,750,000
1944....	806,490,000	371,674,000	238,323,000	13,031,000	183,462,000
1945....	768,816,000	294,357,000	229,792,000	11,304,000	233,363,000
Total..	2,013,061,000	833,991,000	642,144,000	26,502,000	510,424,000

NOTE: This tabulation includes marine equipment accepted by the Quartermaster Corps during the fiscal year 1942 and rail equipment accepted by Corps of Engineers during the fiscal years 1942 and 1943, before the procurement of such equipment was transferred to the Transportation Corps. Equipment and supplies procured by other agencies (e.g., Navy, Maritime Commission, Ordnance Department) for the account of the Transportation Corps are not included.

"Change orders" were responsible for many production delays in the beginning, and therefore were placed under strict control. When a change in plans or specifications was requested during production, by the contractor, the Transportation Corps inspector or the agency by which the item was to be used, it was reviewed in the office of the Director of Supply as to technical desirability and the price adjustment involved. If approved, the contracting officer was authorized to issue the appropriate change order in the form of a supplemental agreement amending the original contract. None but the contracting officer was permitted to issue change orders, so that inspectors or other persons visiting plants were prevented from taking action that would delay production or increase cost.

The establishment of a neffective inspection system involved two main problems. The first was to provide competent personnel for this highly important technical work. Many men were recruited from the active rosters of manufacturing plants producing items similar to those to be inspected, but it was necessary also to engage retired employees, and use was made of a considerable number of women who had had no previous industrial experience. All inspectors were thoroughly trained before assignment to duty at contractors' plants. The second problem was to standardize inspection practices. This was accomplished by a manual, prepared in the Transportation Corps, which covered the objectives and the technical

application of inspection to each classification of equipment and supply procured. The inspector-in-charge at a given plant had supervision of all other inspectors assigned to that plant, and he was the liaison agent between the contractor and the Transportation Corps supply organization.

Research and Development

Much of the equipment procured by the Transportation Corps was adapted from standard or commercial types. However, the work of modifying existing specifications to meet varied and changing military requirements was an unending task. In addition, there were some items of equipment and supply which were peculiar to military transportation and offered opportunity for experimentation and invention. This was a field in which the accomplishments of the Transportation Corps were limited by the lateness of its start. Research and development should be a continuous process during both peace and war years. The rapidly changing demands of global warfare accentuate the need for an aggressive, forward-looking program.

As it worked out, adaptations and new designs in most cases followed requests from oversea commanders or from other services using transportation equipment. When the needs had been verified, existing designs were checked to ascertain how

127-ton locomotive built for service in France.



far they met the new requirements and what modifications were necessary. If no suitable articles were found, the Technical Staff of the Director of Supply, later designated the Research and Development Division, undertook the development of new designs. When preliminary plans had been approved, they were sent to the engineering staff for the accomplishment of detailed drawings and specifications. At all stages, standardization of designs and economy in the use of critical materials were kept in view, along with the suitability of the completed equipment to fulfill the military requirements.

During the period immediately following the entry of the United States into the war, the demand for marine equipment from oversea commanders and the technical services was so great that it was necessary to procure this equipment wherever it could be obtained. As a result, a great variety of types, makes, and sizes was acquired. This created a serious problem in the stockpiling of replacement parts, and also the training of personnel to operate and maintain the diverse equipment. Accordingly, a program of standardization was begun late in 1942, which resulted in a marked reduction in the number of new designs approved and a simplification of old designs through the standardization of materials and parts, and the elimination of nonessential elements. Specifications and blueprints were provided to all contractors to whom awards were made.

When responsibility for the design and procurement of railway equipment was assigned to the Transportation Corps in November 1942, a few officers were transferred from the Corps of Engineers, but personnel to handle this new assignment had to be recruited chiefly from industry. The problems of design were numerous, since so many oversea countries were involved. In order that American-built equipment might operate in conjunction with foreign equipment, it was necessary to build locomotives and cars to more than 30 different combinations of track gauge, brakes, side buffers, and couplers, and in addition to conform to foreign clearance and roadbed limitations. Despite these varying requirements, a consistent effort was made to standardize designs as much as possible, in order to simplify maintenance and keep spare parts requirements at a minimum.

The process of standardization was furthered by the appointment of a Transportation Corps Technical Committee early in 1943, including representatives of the Director of Supply, and the Water and Rail Divisions. In accordance with Army Service Forces policy, all major items which were of a recurring nature were classified as to type, in order that procurement, including spare parts, could be planned and distribution effected on an orderly basis. The classification of equipment and all development projects were processed through the Technical Committee, which dealt with 164 items up to VJ-Day. Of these, 73 were marine items, 82 were railway items, and 9 were materials handling equipment.

Considerable confusion and delay resulted in the beginning from the lack of standard nomenclature for use in the requisitioning, storing, and issuing of equipment, spare parts, and supplies. This problem was attacked by the preparation of a basic nomenclature guide, first issued in November 1943, which established a positive system of article identification. No code was used, but a brief description of each article was given, including basic characteristics. Illustrated catalogs of marine, rail, and materials handling equipment were prepared, which aided oversea commanders and other technical services in ascertaining the characteristics of equipment already available, and helped to reduce requests for new designs.

Transportation requirements and the conservation of shipping space were always kept in mind in establishing designs. All railway cars for oversea use were designed for shipment in knocked-down condition. Several types of steel barges were manufactured in sections, to be bolted together in the theaters, or welded where welding facilities were available. The standard 112-foot knock-down barge was used not only for the transportation of cargo, but also as a base for floating cranes, repair shops, and refrigerated storage. Several small tugs were designed so as to be transportable by rail, their pilot houses being demountable.

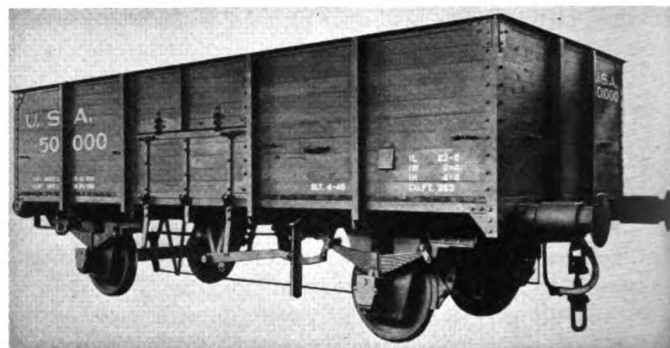
Mention of a few developmental projects will suffice to illustrate the variety of items with which the Transportation Corps dealt. A four-man craft for inclusion in the equipment of the 85-foot aircraft rescue boat, and with characteristics which would enable it to serve as a work boat and a lifeboat,

105-ton locomotive procured for the Russian railways.

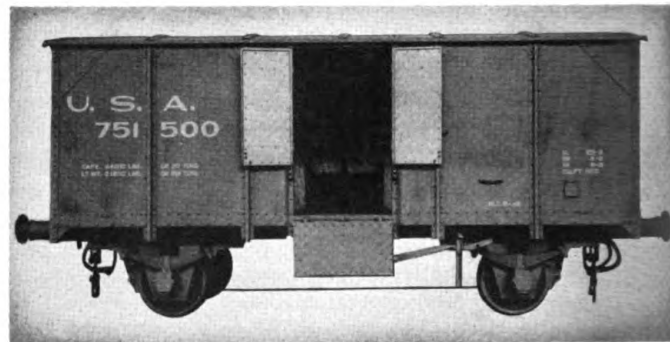




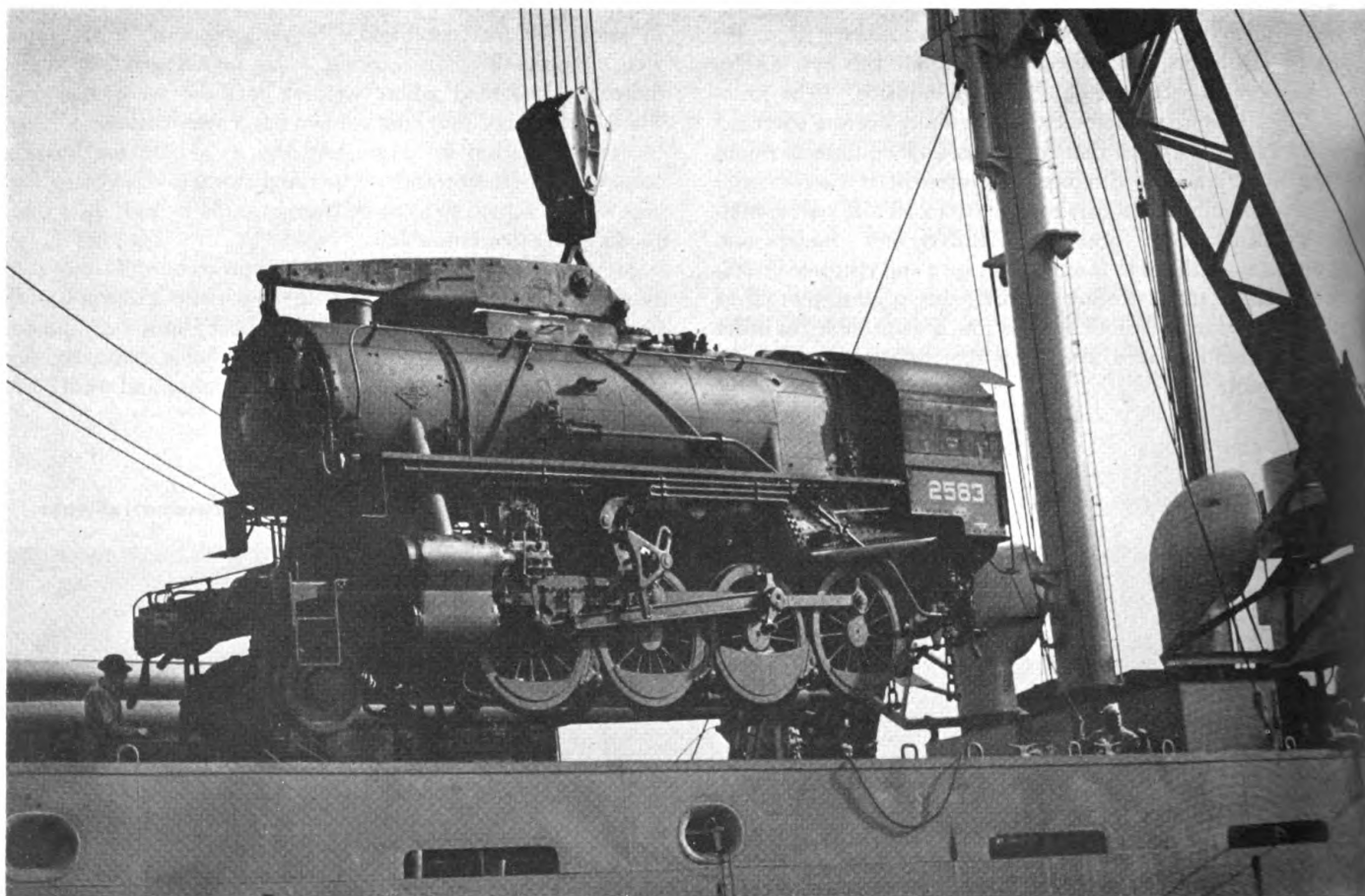
65-ton Diesel locomotive built principally for the European theater.



Types of freight cars built for use on foreign railroads.



The substitution of a lifting bar for a sling greatly facilitated the hoisting of locomotives.



was developed with the use of moulded plywood, eliminating the use of frame and other structural members, and giving the hull both lightness and strength. A complete hospital train was designed and built for use in combat areas, with 16 ward cars, kitchen car, and personnel cars, each unit being 40 feet long and designed to negotiate the sharp curves, narrow bridges, and low tunnels of foreign railroads. A new life preserver of the yoke type was developed, particularly for the use of troops participating in amphibious operations, which could be quickly put on or removed without interfering with the soldier's field equipment. An improved type of mine planter to handle larger submarine mines, several new types of life rafts with improved structural and safety elements, and improved types of locomotives and cars were placed under development. Research into the applicability of jet propulsion to craft for shallow water operation, and the use of cycloidal propellers for various types of boats, was undertaken. Captured enemy transportation equipment was studied to determine what features might be profitably utilized.

Cooperation with the Director of Supply in the improvement of all equipment procured by the Transportation Corps was one of the responsibilities of the Transportation Corps Board which was created early in 1945, with headquarters at Fort Monroe, Virginia. In addition, the Board was charged with developmental work in other fields of Transportation Corps activity.

Yoke type life preserver designed for use by soldiers carrying normal field equipment.



Storage and Stock Control

During 1942 and 1943, stocks of Transportation Corps matériel were stored at holding and reconsignment points and ports of embarkation, and the supply officers at those installations maintained stock records and inventories of all items on hand. Gradually, however, the stocks became so large, and the problem of stock control so formidable, that a different arrangement was necessary. Accordingly, in February 1944, allotments of space at four holding and reconsignment points—Voorheesville, Marietta, Montgomery, and Lathrop—were made to the Director of Supply, for the establishment of Transportation Corps depots. Subsequently subdepots under Lathrop were set up at the Auburn and Yermo holding and reconsignment points, and another under Voorheesville at the Elmira Holding and Reconsignment Point. In May 1945, these seven installations had assigned approximately 3,000,000 square feet gross of warehouse space and 15,000,000 square feet gross of open storage space for depot purposes.

A degree of specialization was established, for economy of operation and to promote stock control. The Marietta depot stocked railway equipment and spare parts. The depot at Voorheesville stocked marine equipment and supplies and port battalion equipment. The Montgomery depot stocked marine engines, accessories, and spare parts. The Lathrop depot

Testing a new life float designed to support 10 persons out of the water and 15 persons clinging to the ropes.





Storing marine supplies at the Montgomery depot.



Railway equipment in storage at the Marietta depot.

stocked the types of matériel which were stocked at Marietta and Voorheesville. Each depot was restricted as regards the issue of equipment and supplies to installations in certain parts of the zone of interior, and to certain ports of embarkation for shipment to overseas commands. The subdepots served also as classification centers for Transportation Corps matériel returned from overseas. The depots did not provide wet storage for floating equipment, but left that function to the ports of embarkation.

The depots were responsible for the receipt, preservation, processing, and storage of Transportation Corps equipment and supplies, and for packing, crating, and marking them for shipment. They assigned and trained their regular employees, but drew upon the labor pool of the holding and reconsignment points for common labor required for loading and unloading cars and blocking and bracing heavy equipment. In the beginning, the officers in charge of the depots were responsible to the commanders of the holding and reconsignment points, but subject to the technical supervision of the Distribution Division in the Office of the Chief of Transportation. From January 1945 they were responsible directly to the Distribution Division, and later to the Requirements and Distribution Division.

The objective was to maintain depot stocks at the minimum consistent with the mission of supplying all requirements promptly. This involved establishing stock levels and maintaining a complete system of stock control. In establishing stock levels, the chief problem concerned items which had not been stocked previously. The difficulty was met by having the stock control units at the New York and San Francisco

Ports of Embarkation supply the Distribution Division with copies of all extract requisitions for Transportation Corps supplies. From these the division was able to build up a record of demand, supply, and issue experience, which served as a basis for fixing realistic stock levels.

In June 1944, in the midst of the heavy demand for equipment and supplies for the invasion of Continental Europe, the Army Service Forces conducted a test to establish, among other things, the effectiveness of stock control in the several technical services. For the 110 Transportation Corps items involved, the test showed that 8 were in short supply, 66 in balanced supply, and 36 in long supply.

A readjustment of stock control was effected in April 1945, with a view to having only one control point for each general class of supply. Thus, the Marietta depot became the stock control point for the railway equipment and spare parts which were stocked by it and the Lathrop depot. The Voorheesville depot became the stock control point for the marine and port equipment and supplies stocked by it and the Lathrop depot. Montgomery was designated stock control point for the supplies which it stocked exclusively. This plan set up a single control record for all supplies of a given type, so that there was never any delay in ascertaining the total stocks available in the zone of interior.

The depots were required to maintain a sufficient reserve of equipment to meet the requirements of Transportation Corps troop units likely to be activated and sent overseas. Close cooperation between the Distribution Division and the Military Training Division was necessary to this end. The depots, which kept stock records of all items in the so-called equipment

reserve, were informed by the Distribution Division of prospective requirements, and initiated the requisitions necessary to maintain the required stock levels.

The Distribution Division was the agent of the Director of Supply for determining the adequacy of the packing, packaging, and processing of equipment and supplies at the Transportation Corps depots, and recommending improvements. Specifications were established for each item or class of items. The receiving branches of the depots were responsible for the inspection of incoming shipments to determine whether instructions relating to packing and identification had been complied with by vendors. Close surveillance in these respects of both incoming and outgoing shipments was necessary to insure safe transportation and correct delivery.

Maintenance

The maintenance problem was of special significance to the Transportation Corps, because so large a proportion of its matériel was of the nonexpendable type and had to be kept in good running order. The problem was an exceptionally difficult one for the Transportation Corps, because, having assumed its procurement responsibilities so late, it was under necessity of obtaining equipment wherever it could be found. It thus acquired a variety of types and sizes, particularly in the marine field, which restricted the interchangeability of parts, and frequently threw the users of the equipment upon their own resources.

This situation was overcome to a large extent by the progressive standardization of equipment, but in the meantime the various phases of maintenance responsibility had been delegated to the Water Division, Rail Division, Research and Development Division, and others. As a result, the function which eventually devolved upon the Maintenance Division was

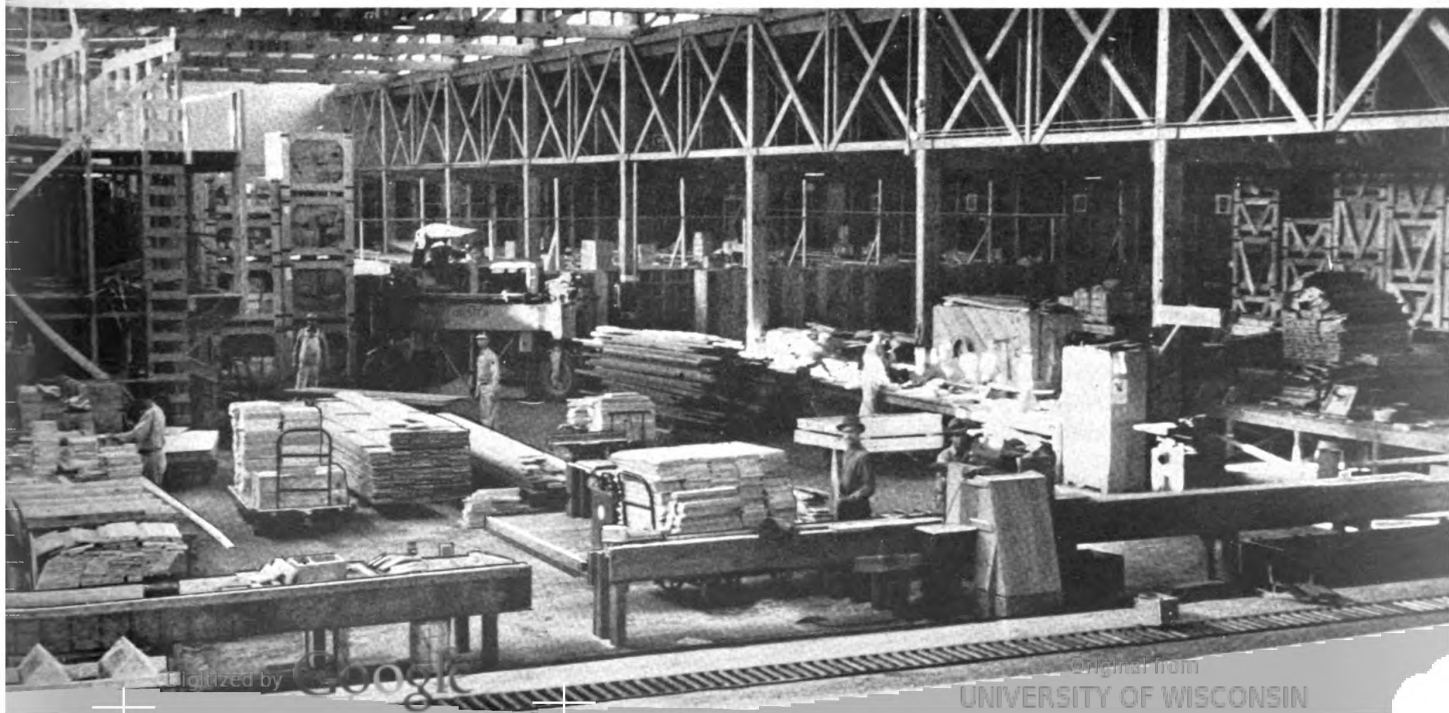
essentially one of coordination. On the one hand, it coordinated Transportation Corps practices with Army Service Forces policies. On the other hand, it coordinated the maintenance activities of the several elements of the Transportation Corps, and aided them by whatever means possible in the performance of their maintenance functions.

Unsatisfactory equipment reports received from the commands and agencies utilizing Transportation Corps equipment were reviewed by the Maintenance Division, which then followed up the processing of the reports through the several divisions, until appropriate modification work orders were issued. Information was gathered from any available sources regarding equipment deficiencies or maintenance problems and placed in the hands of the proper divisions for corrective action. In collaboration with the Transportation Corps Technical Committee, the Maintenance Division proposed design changes which would simplify maintenance and reduce lay-ups for repairs. A manual outlining methods and procedures for storing equipment over long periods was prepared, with a view to insuring the proper handling and maintenance of Transportation Corps matériel stored as a strategical reserve during the postwar period.

Property Disposal

Changing requirements in the field left the Transportation Corps with a growing amount of excess equipment, and in April 1944 a division was established to arrange for its redistribution or disposal. Originally, the individual field installations prepared declarations of excess property, which the Property Disposal Division circulated to all Transportation Corps installations, and then to the other technical services, the Army Air Forces, and the Navy. However, this did not provide for a determination of the Transportation Corps' over-all

Processing and carpenter shop at the Lathrop depot.



needs, and with this in view the procedure was changed in October 1944, so that responsibility for declaring property excess was vested in the Stock Control Division, later the Distribution Division, of the Office of the Chief of Transportation.

Excess property lists were given the widest possible circularization, with good results. Of the total made available in the zone of interior up to VJ-Day, valued at \$48,276,000, property valued at \$34,943,000 either had been redistributed or had been reported as surplus to the disposal agencies.

Property to be disposed of as a result of terminated contracts was handled differently. The property disposal officers in the transportation zones ascertained from the contractors what part of the termination inventories they desired to retain. The remainder was examined to determine whether it would be of use to the Transportation Corps. The other technical services, the Army Air Forces, and the Navy then were solicited to ascertain what items were of interest to them. Property not desired by the Transportation Corps was disposed of on the basis of "first come, first served," in order to expedite clearance of the contractors' plants. When the cost of property to be disposed of exceeded \$500,000 and it was proposed to sell it at a price lower than 25 percent under cost, the transaction required the approval of the Disposal Board in the Office of the Chief of Transportation. That part of the termination inventory not disposed of, was deemed surplus and reported to the regional office of the Reconstruction Finance Corporation.

After VJ-Day, circularization of military and nonmilitary property was discontinued, and property considered to be in excess of the Transportation Corps' needs was immediately declared to the Maritime Commission, Reconstruction Finance Corporation, or other federal disposal agency.

The Property Disposal Division was designated by the Chief of Transportation to cooperate with Army Service Forces headquarters in making disposition of property reported excess by oversea commanders. Acting in this capacity, it received lists of such property, and through contacts with other divisions of the Office of the Chief of Transportation determined whether the various items should be returned to stock in the United States, shipped to another theater, or declared surplus.

Readjustment of Contracts

Changes in strategy, improvements in equipment, reallocations of scarce materials, and other factors necessitated terminations of and cut-backs in outstanding contracts long before victory was in sight. Pursuant to acts of Congress and War Department policies established under those acts, the Transportation Corps used all possible means to effect proper adjustments with contractors promptly. Although the Contract Settlement Act of 1944 provided that fair compensation for contractors could be determined without agreement or by arbitration, determination by negotiated agreement was found to be the most satisfactory and expeditious method.

Terminations were made only as authorized by the Director of Matériel and Supply. To facilitate the proceedings, con-

tracting officers in the field procurement offices and at ports of embarkation were authorized to effect terminations without prior approval when the original amounts of the contracts were within certain limits. Following the defeat of Germany, a Settlement Review Committee was set up to consider and approve proposed termination settlements when payments to contractors or subcontractors beyond certain amounts were involved. The committee included the Director of Supply, and the Chiefs of the Fiscal, Legal, and Property Disposal Divisions. During the war period, 2,164 terminations were settled, involving canceled items valued at \$427,479,000. Since VJ-Day the settlement of contracts terminated as the result of the cessation of hostilities has proceeded with satisfactory speed.

Upon receiving notice of the termination of a contract within his zone, the zone supply officer (or area procurement officer during the late months of the war) promptly arranged a meeting between representatives of the Transportation Corps and the contractor, preferably at the contractor's plant, for the purpose of outlining the procedures to be followed and setting up a time schedule. The contractor's problems were discussed and instructions given as to the proper presentation of his claim. These preliminary meetings greatly facilitated final settlements.

Beginning in August 1944, training was given to prepare Transportation Corps personnel to handle the many aspects of contract termination. The education of employees of contractors in the provisions of the law and the procedures established by regulation, which was undertaken in advance of actual terminations, also proved a good investment.

The work of the Joint Army-Navy Termination Committee in coordinating the policies and procedures of the two departments, was helpful to the Transportation Corps, since it and the Navy were involved with the same contractors to so great an extent. By agreement, the Navy was authorized to act for the War Department in certain instances, and vice versa. Contractors having war contracts with a number of government agencies, could apply to either the Army or the Navy for settlement of all such contracts. The applications were reviewed by a committee representing the armed services and the Office of Contract Settlement, which assigned them to either the Army or the Navy for action.

The Chief of Transportation and his designated representatives were authorized to make adjustments upward on fixed price contracts for the construction of vessels, when the contractor's net cost of performance had been increased, directly or indirectly, on account of the provisions of the zone standard agreements relating to the wages and conditions of labor in shipyards. These agreements were formulated by the Shipbuilding Stabilization Committee of the War Production Board, upon which the Chief of Transportation was represented. The Transportation Corps worked closely with the Navy and the Maritime Commission, so that uniform policies in regard to price adjustments would be followed. All price increases were subject to price ceilings fixed by the Office of Price Administration, or the approval of that agency in special cases.

SECTION VI

MILITARY TRAINING

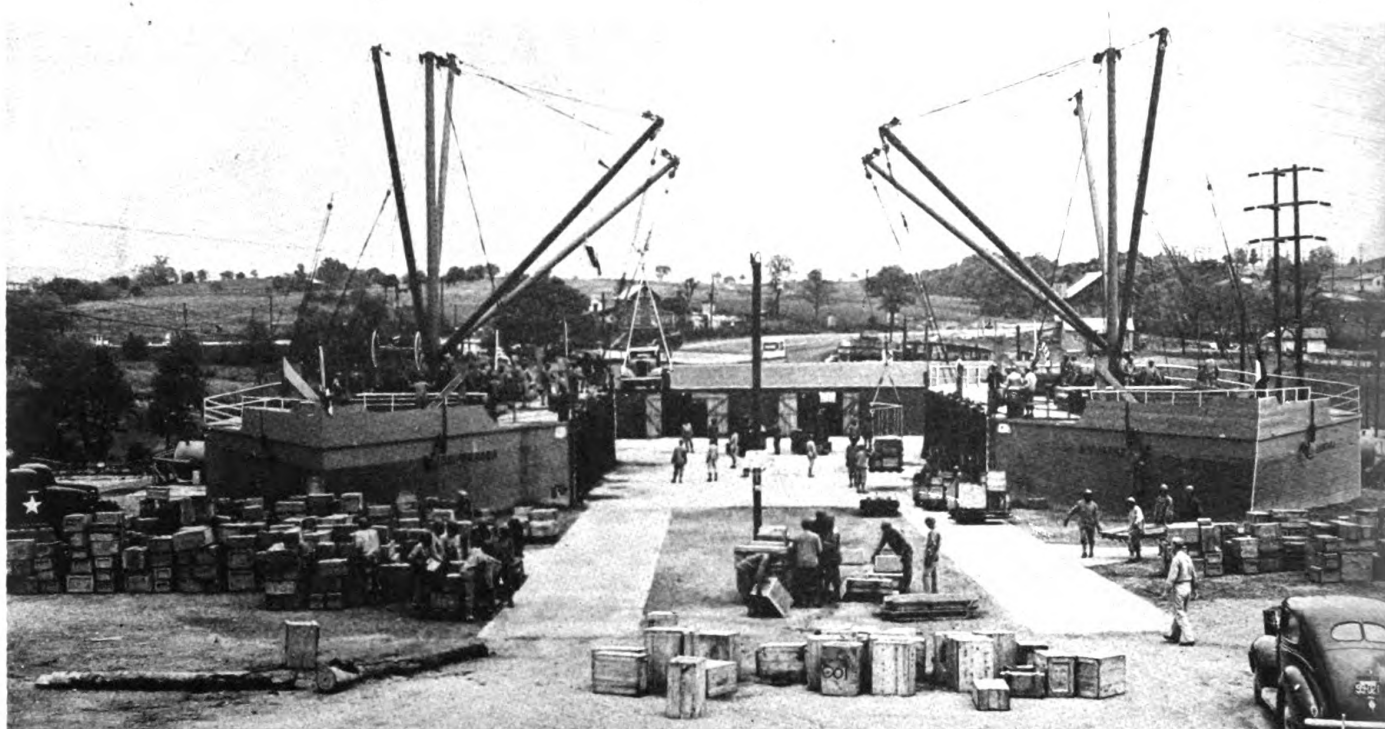


Elementary lesson in driving the amphibian truck.

Prior to the establishment of the Transportation Corps, tables of organization existed for two groups of transportation troop organizations—those relating to oversea port operations and those relating to military railways. The port organizations were embraced in the Quartermaster Corps until they were transferred to the Transportation Corps at the time of its creation in July 1942. The railway organizations were embraced in the Corps of Engineers and continued in that status until November 1942 when they were transferred to the Transportation Corps, along with other responsibilities pertaining to the Military Railway Service.

In the summer of 1942 it was apparent to the Chief of Transportation that the demand for port units for oversea service would be heavy and that new types of transportation organizations would be required. Accordingly, in July of

that year a unit training center was established at the Indian-town Gap Military Reservation in Pennsylvania. In November, the month in which the Military Railway Service was transferred to the Transportation Corps, another training center was established at the New Orleans staging area, which became known as Camp Plache. Subsequently, a training center for amphibian truck companies, harbor craft companies, and certain other marine units was set up at Camp Gordon Johnston, Florida, and a training center for railway troops was located at Fort Francis E. Warren, Wyoming. These Army Service Forces installations, together with ports of embarkation and the holding and reconsignment points, provided basic military and technical training for Transportation Corps troop units and replacements during the latter stages of the war.



"Land ships" were used for basic training in handling cargo.

Instruction in operating an electric winch on a "live" ship.



The Director of Military Training, who was also chief of the Military Training Division in the Office of the Chief of Transportation, was responsible for the formulation of plans and policies for the organization, activation, technical training, inspection, and commitment of all Transportation Corps units. He directly controlled the training activities at ports of embarkation and holding and reconsignment points, and cooperated with the Military Training Division, Army Service Forces, in establishing effective training programs and methods for Transportation Corps units and replacements at the Army Service Forces' training centers.

Port Organizations

In the beginning, all headquarters for overseas ports (headquarters and headquarters companies) were designated mobile ports. Later they were designated major or medium ports, depending upon the size of the operation and the number of operating and housekeeping units which they controlled, such as port companies, base depot companies, truck companies, and service companies. The port headquarters overseas corresponded to the office of the commander of a port of embarkation in the zone of interior. So far as practicable, port headquarters and headquarters company personnel was drawn from the ports of embarkation and its training was effected at ports of embarkation. Up to the end of the war 24 mobile and major ports and 3 medium ports had been activated. After the close of hostilities, 4 additional medium ports were activated, largely composed of personnel from inactivated major ports. Sometimes the activation of headquarters and headquarters companies took place overseas, using elements assembled from various sources. Thus 2 mobile ports were activated in North Africa, 2 major and 5 medium ports in the Pacific.

The operating units for overseas ports originally were port battalions consisting of a headquarters and headquarters detachment and four port companies. However, in view of the many smaller overseas ports which were being used, it was found advantageous from the standpoint of flexibility to activate and train port companies as independent units, and this plan became generally effective during 1943. Thereafter, port companies were assigned individually, or three to six port companies were placed under a headquarters and headquarters detachment. Port battalions or companies were stationed at 81 overseas ports at the end of the war. A total of 92 headquarters and headquarters detachments, embracing 503 officers and 1,308 men, was activated. A total of 490 port companies was activated, aggregating 2,152 officers and 110,051 men.

The port companies were stevedoring units, but the men also had to be soldiers. Initially, in view of the urgent overseas demand, it was necessary to begin the technical training of some units before the completion of basic military training, but



Trainees were given practice in decontaminating ship's gear.



Members of port companies were taught how to operate the fork lift truck.

this was discontinued as soon as possible. In the beginning, 4 weeks of military training were given, and later 6 weeks. Care was taken to provide the necessary equipment and otherwise insure that the approved standards of military training were attained. Instruction was given in meeting chemical warfare conditions, house-to-house fighting, and jungle fighting when units were destined to the Pacific. Such military training, in fact, was given to all Transportation Corps units after the training program had become fully established.

The period of technical and unit training for port companies was 9 weeks, then 11 weeks, and finally 14 weeks. Of the total period, 3 weeks and later 6 weeks were prescribed for training as a unit, following basic technical training. Although in the early part of the war, port companies were activated and received all their training at ports of embarkation, after unit training centers were available at Indiantown Gap and Camp Plauche, basic military and basic technical training were given there, and unit training was given usually at ports of embarkation. The ports not only had "land ships," similar to those at the unit training centers, but some of them had old vessels which they utilized as training ships, and all were able to give the troops experience in working "live ships" alongside experienced longshoremen.

The technical training for port companies covered all the skills utilized in loading and discharging cargo, both on the ships and on the docks. The greatest problems encountered were the lack of experience among both officers and enlisted men, and the large percentage of slow learners among the enlisted men assigned to this type of unit. These problems became more acute as time went on. The longer period of technical training was therefore a very desirable change. The constant improvement of training equipment and training aids also was a helpful factor. A Technical Manual, entitled, *Water Transportation, Stevedoring, and Stowing*, hastily prepared by the Transportation Corps in 1942, and revised in

1943 and 1944, was in its final form a complete and useful text for officers. Demonstrations, training films, and actual practice were used principally in training enlisted men.

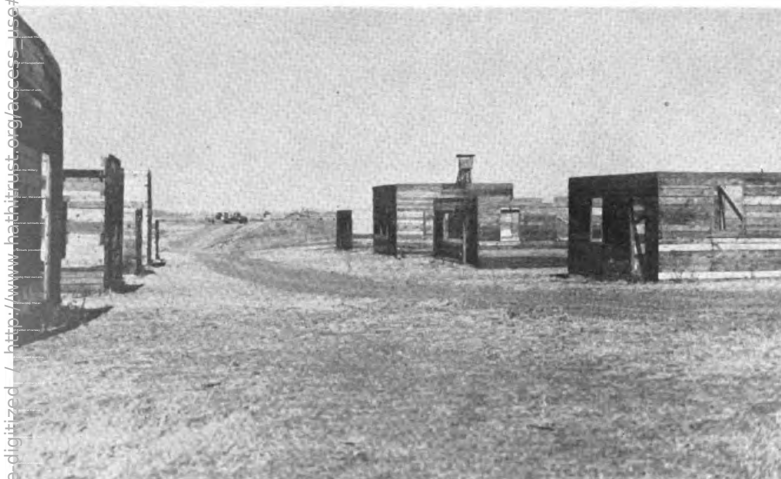
Inspections of port organizations in training, and all other Transportation Corps units except those of the Military Railway Service, were made by representatives of the Director of Military Training, to determine their readiness for overseas service. Deficiencies were discovered as early as possible so that corrective measures could be taken and delay in the departure of the units for overseas service avoided. The inspections by representatives of the Chief of Transportation had the effect of materially reducing the number of units found not ready by The Inspector General.

Military Railway Units

When measures were taken to strengthen the Military Railway Service prior to our entry into the war, the establishment of reserve units sponsored by American railroads was the basis of the plan. The sponsoring railroads provided the officers and enlisted personnel from among their own employees, and also provided the technical training. The arrangement gave the Army a very high caliber of railway troops. When all sponsored units had been called to active duty and more railway troops were needed, contracts were made with certain railroads to provide technical training. This arrangement also worked out very satisfactorily. Not only did the men receive excellent instruction and real experience, but the railroads supplied the necessary equipment and shops, which it would have been difficult for the Army to secure promptly because of wartime shortages. In most cases the units were housed at Army camps near the railroads, which were training them.

When enlisted men with railway experience were called from the reserve to active duty, or were inducted into the

Mock village used for instructing Transportation Corps troops in street fighting.



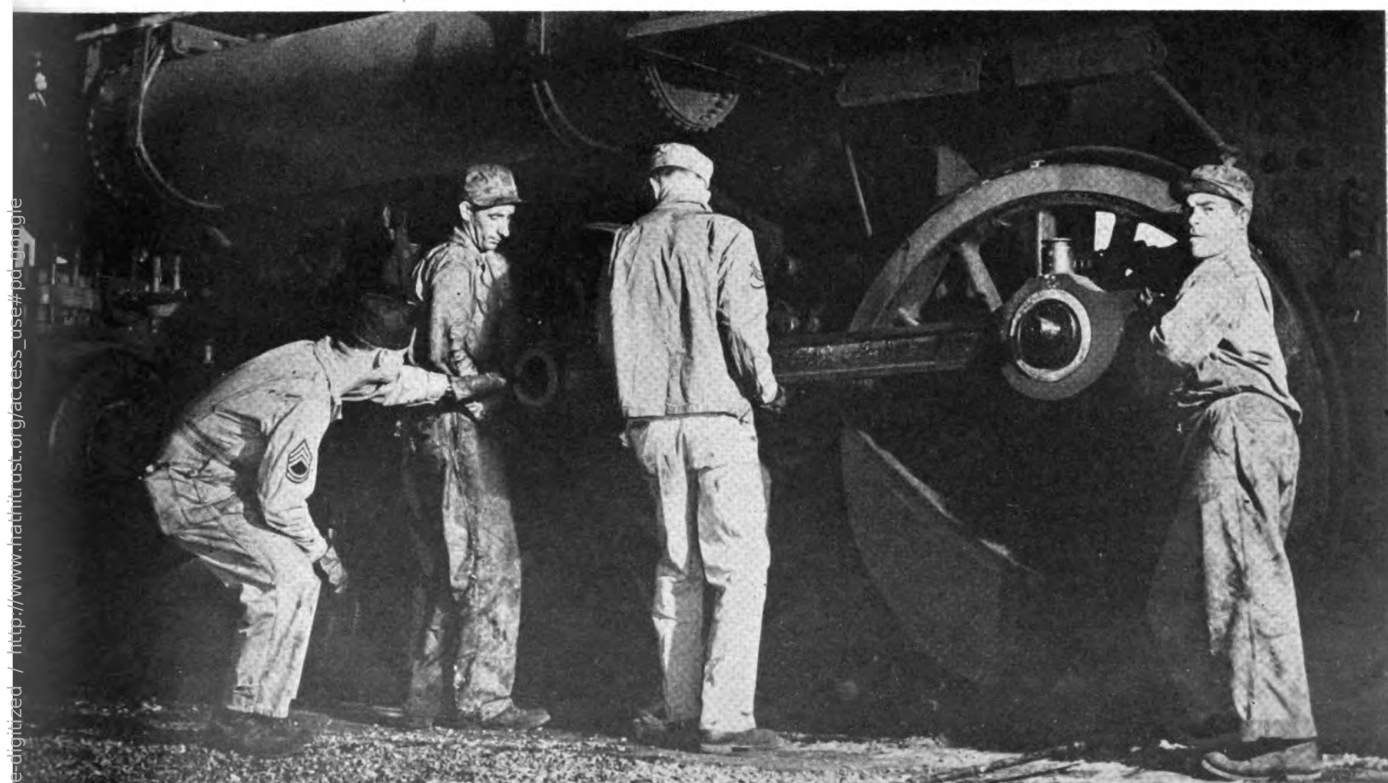
Troops in training received infiltration practice under simulated combat conditions.





Members of a railway operating battalion learning how to repair a trestle.

Members of a railway shop battalion in training get practice in putting on a side rod.



Army through Selective Service, they were sent from the reception centers directly to the unit training center at New Orleans, or, after September 1944, to Fort Francis E. Warren. There they received basic military training in a provisional battalion until the unit had attained full strength and was activated and sent to a railroad for technical and unit training. Up to 1944 the units were composed almost entirely of experienced railroad men. Thereafter it was necessary to utilize some inexperienced personnel, but the proportion of experienced men did not fall below about 85 percent.

Because of the limited facilities which it possessed, and the unusual advantages gained during wartime by having troops trained on the commercial railroads, only a small proportion of the railway units activated during the war received their technical training on the Claiborne-Polk Railway. Nevertheless, this 50-mile stretch of track which was built by the Army during 1941-42 for training purposes, served a very useful purpose. Problems in track and bridge repair work, and in dealing with derailed rolling stock, could be set up for solution on this training line, which could not be introduced on railroads actively engaged in handling traffic.

There were four major types of railway organizations. The headquarters, Military Railway Service, was required only where the operation was large, and in fact only three such organizations were established—in the North African (Mediterranean) Theater, the European Theater and the Persian Gulf Command. The headquarters, railway grand division, was set up to supervise two to six operating battalions and one or two shop battalions. The railway operating battalion included a transportation company with two platoons of 25 train crews each, a maintenance of way company, a maintenance of equipment company, and, when needed, a Diesel section and an electric power transmission company. The railway shop battalion included an erecting and machine shop company, a boiler and smith shop company, and a car repair company. In addition to these major units, there were hospital train maintenance platoons, mobile workshop platoons, and track maintenance platoons. The Military Railway Service, in other words, was prepared to handle any kind of work that might be required of it, except new construction of tracks and structures, which was an Engineer function. It handled many repair jobs, however, which were tantamount to new construction.

Since most of the officers and enlisted men had railroad experience, and in order that the period of unit training might be as long as possible, the Army Service Forces requirement that troops receive basic technical training before being assigned to units, was waived in the case of railway units, which were activated immediately after completion of basic military training. Railway troops, therefore, received longer training as units than other Transportation Corps organizations. Headquarters, Military Railway Service, and headquarters, railway grand division, received 11 weeks of unit training, operating battalions 17 weeks, and shop battalions 19 weeks.

During the greater part of the war the supervision of such training was under a Director of Railway Training, who was stationed at the New Orleans unit training center, but functioned under the general supervision of the Director of

Military Training in the Office of the Chief of Transportation. By December 1944, however, the training program had been so far completed that the Office of the Director of Railway Training was discontinued.

Close cooperation was maintained between the Military Training Division and the Rail Division in regard to all matters affecting railway troop organizations. When the Office of the Director of Railway Training was closed, the Rail Division assumed responsibility for the inspection of railway units in training, and established a branch to carry forward that activity. Reports of inspections were received by both the Military Training Division and the Rail Division, and any corrective actions were developed by consultation.

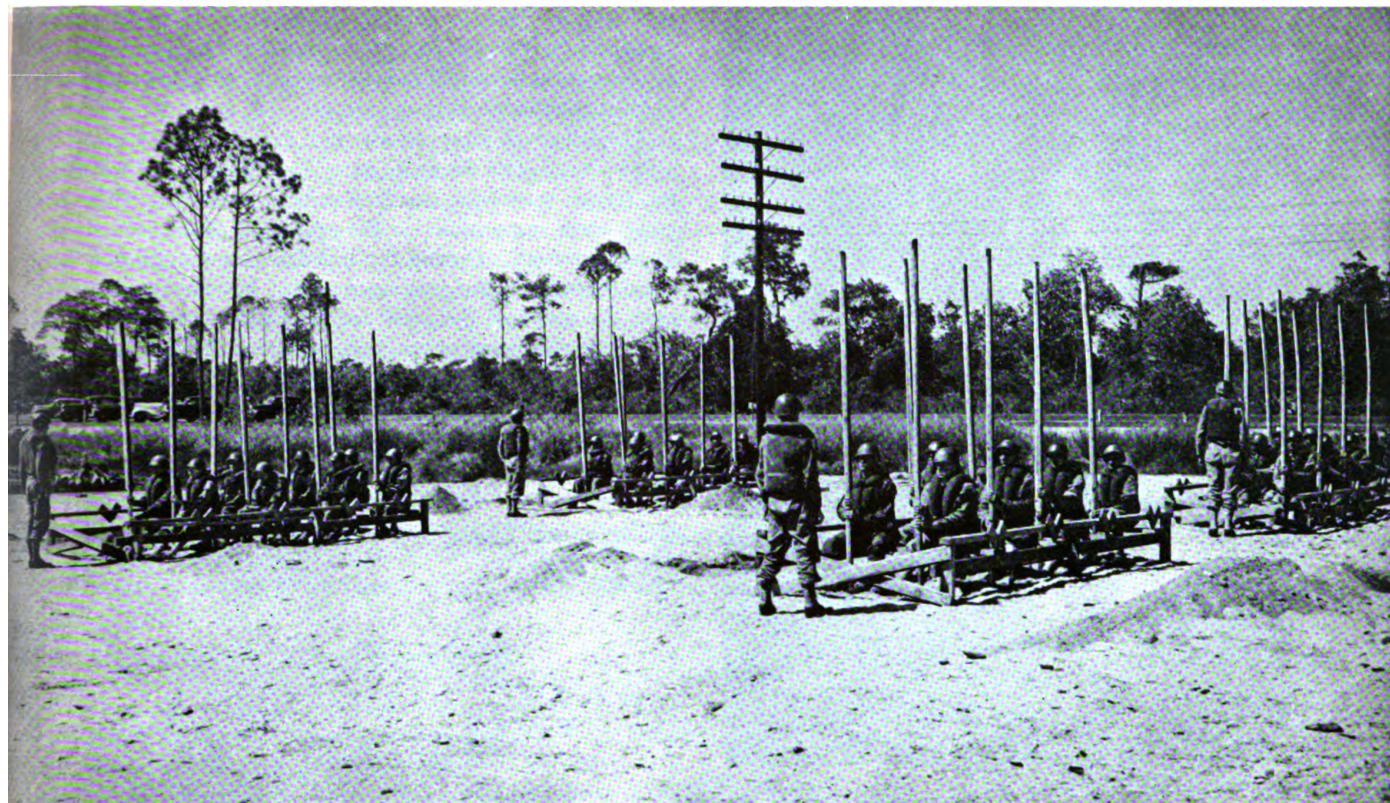
A summary of railway troop units activated up to the end of the war, including the few which were activated abroad, with authorized strength, is given below:

Type of unit	No. of units	Officers and warrant officers	Enlisted men
Hq., Military Ry. Service	3	96	526
Hq., Ry. Grand Division	12	311	810
Ry. Operating Battalion	38	970	31,668
Ry. Shop Battalion	12	312	7,660
Other Railway Units	33	59	2,633
Total	98	1,748	43,297

Harbor Craft Companies

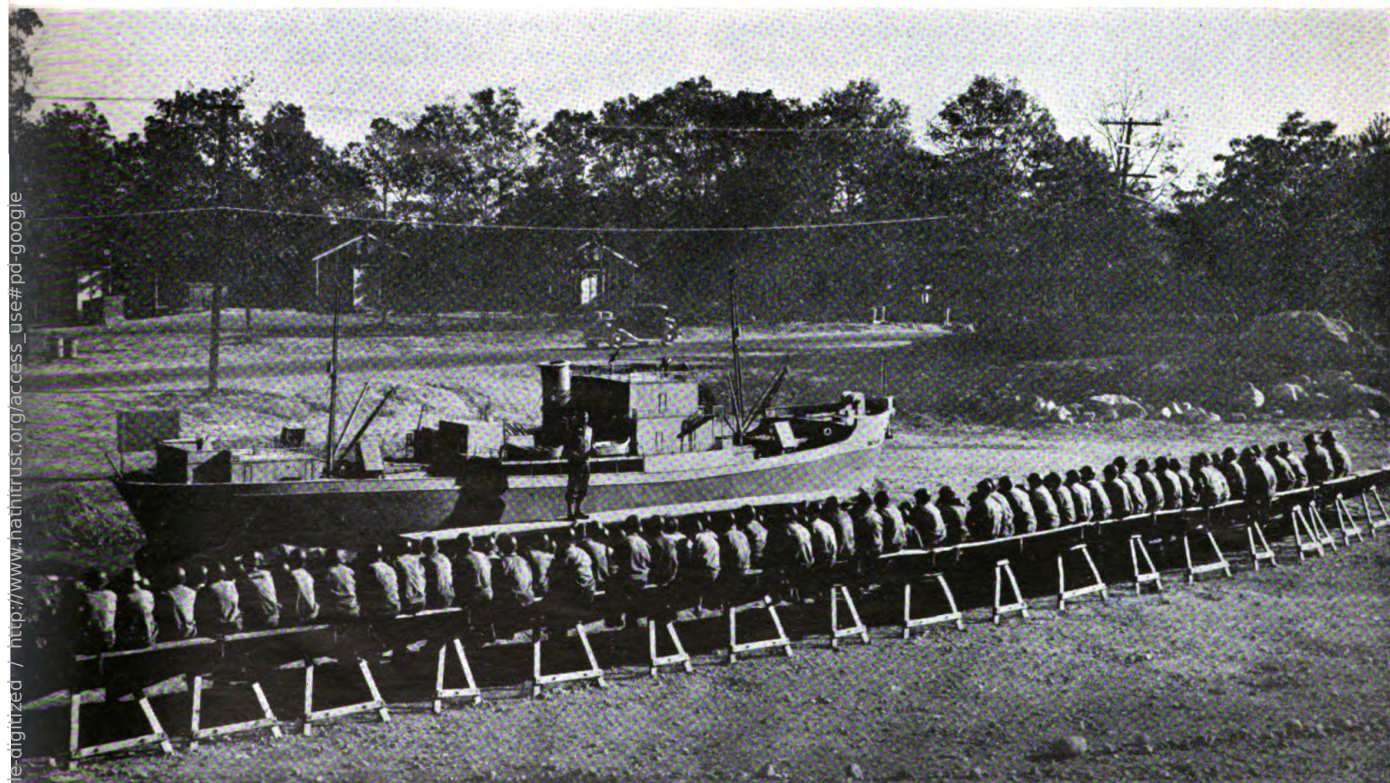
Among the new types of units which the Transportation Corps was required to train were harbor craft companies, utilized to operate the Army's great fleet of small boats and other floating equipment which the war called into being. The heavy demand came first from the expansive Southwest Pacific area, where the United States forces were mainly reliant upon coastwise and interisland transportation. Since the military training program, which had to be built up from scratch, could not supply such units as rapidly as they were needed, Coast Guard personnel was used to man many of the vessels which required military crews, and civilian personnel was used on others. Altogether, 57 harbor boat companies were activated, 46 in the zone of interior and 11 overseas. They had a total authorized strength of 1,785 officers and 13,792 enlisted men.

The great variety of floating equipment necessitated a highly variegated training program. Freight vessels, tankers, tugboats, motor launches, self-propelled barges, floating cranes, marine tractors, etc., required separate study to determine the requirements and the proper instruction for operating and maintenance personnel. Four broad classes of crews were set up, but the technical training within the classes was highly diversified. While some personnel with marine experience was assigned, including graduates from the Transportation Corps Marine Officers Cadet School, for the most part both officers and enlisted men were green. The development of such personnel into competent boat operators was the principal problem which confronted the training staff. The large number of officers required in relation to the number of men was an added problem.



First steps in making sea-going soldiers out of landlubbers at Camp Gordon Johnston.

A lesson in ship terminology.





Transportation Corps marine officer cadets learning the use of instruments.

The technical training of harbor boat companies was first provided at the Charleston Port of Embarkation, beginning early in 1943. However, the limited facilities and the operational requirements of the port led to the establishment of a unit training center for these and other marine units at Camp Gordon Johnston, Carrabelle, Florida, on the Gulf of Mexico. The program originally called for 6 weeks of basic military training (usually at Camp Plauche), 8 weeks of basic technical training ashore, and 3 weeks of training for individual crews and teams afloat. It was found, however, that 6 weeks of training afloat was necessary to properly prepare a unit, and this was arranged. The basic technical and unit training were conducted by a harbor craft training regiment which had a staff of about 135 officers and 670 enlisted men, including trainer crews on the training fleet. Many seasoned officers were assigned to this staff, but it was necessary to use also competent trainees from earlier classes.

The period of basic technical training was devoted largely to the training of specialists, administrative as well as technical. Thirty such specialist categories were established. Scarcity of equipment was one of the early difficulties, but this was overcome eventually. The differing periods required to complete training in the different specialties, and the fact that some of the training had to be given at schools a distance from the camp, were continuing problems. The harbor at Carrabelle was not wholly satisfactory, because it did not accommodate the larger boats, which had to be anchored outside where they

were not so easily accessible to the trainees. On the other hand, the harbor was so well sheltered that the crews of barges, cranes, and other small floating equipment had no opportunity to gain experience in rough water.

The larger training vessels took extended cruises. Trainer and trainee crews were paired, trainer master and trainee master, trainer boatswain and trainee boatswain, etc. The trainer crews were responsible for the operation of the vessels as well as for training. During the first few days at sea the trainees merely observed the permanent crew, but they gradually took over the duties of the crew and handled the vessel completely during the last week or ten days. During the cruises, calls were made at several ports to give the trainees experience in handling the vessels in channels and anchorages, and at the docks. Much of the running was done at night under black-out conditions. A similar routine, adapted to the different operating conditions, was followed with the operating teams for smaller boats, tugs, and barges. Maintenance and repair teams usually received their unit training at maintenance shops where vessels of the training fleet were given necessary attention.

Amphibian Truck Companies

The amphibian truck was not available for practical use until after we had entered the war. Vehicles which were sent to the Pacific for experimental operations quickly proved their value and requests for additional vehicles were received. In order to provide the required crews, an amphibious vehicle training school was established in March 1943 at the Charleston Port of Embarkation with a capacity of 350 trainees. This quickly was shown to be inadequate, and in December 1943 the training was transferred to Camp Gordon Johnston, where as many as 160 officers and 3,600 enlisted men were trained at one time. Altogether, 70 amphibian truck companies were activated during the war, including 51 activated and trained in the zone of interior by the Transportation Corps, 13 activated overseas, and 6 activated by the Quartermaster Corps and the Corps of Engineers and later transferred to the Transportation Corps. These units had an aggregate authorized strength of 434 officers and 12,395 enlisted men.

The tests for determining the fitness of personnel for assignment to amphibian truck companies were exacting. This is illustrated by the fact that out of 2,136 enlisted men who were in the first group sent to Camp Gordon Johnston, 500 were found unfit for the assignment—96 for physical disability, 48 for psychoneurotic conditions, and 356 for lack of driver aptitude and slow learning ability. Later, some additional men had to be reassigned because of lack of adaptability. Fear of the water, unwillingness to operate alone, and dislike of operating at night were among the conditions which made a man unsuitable for the type of work required of these units.

Amphibian truck companies were drilled in handling all types of cargo suitable for stowing in their vehicles. The most difficult part of the operation was coming alongside and receiving cargo from the ship's gear, especially in rough water,

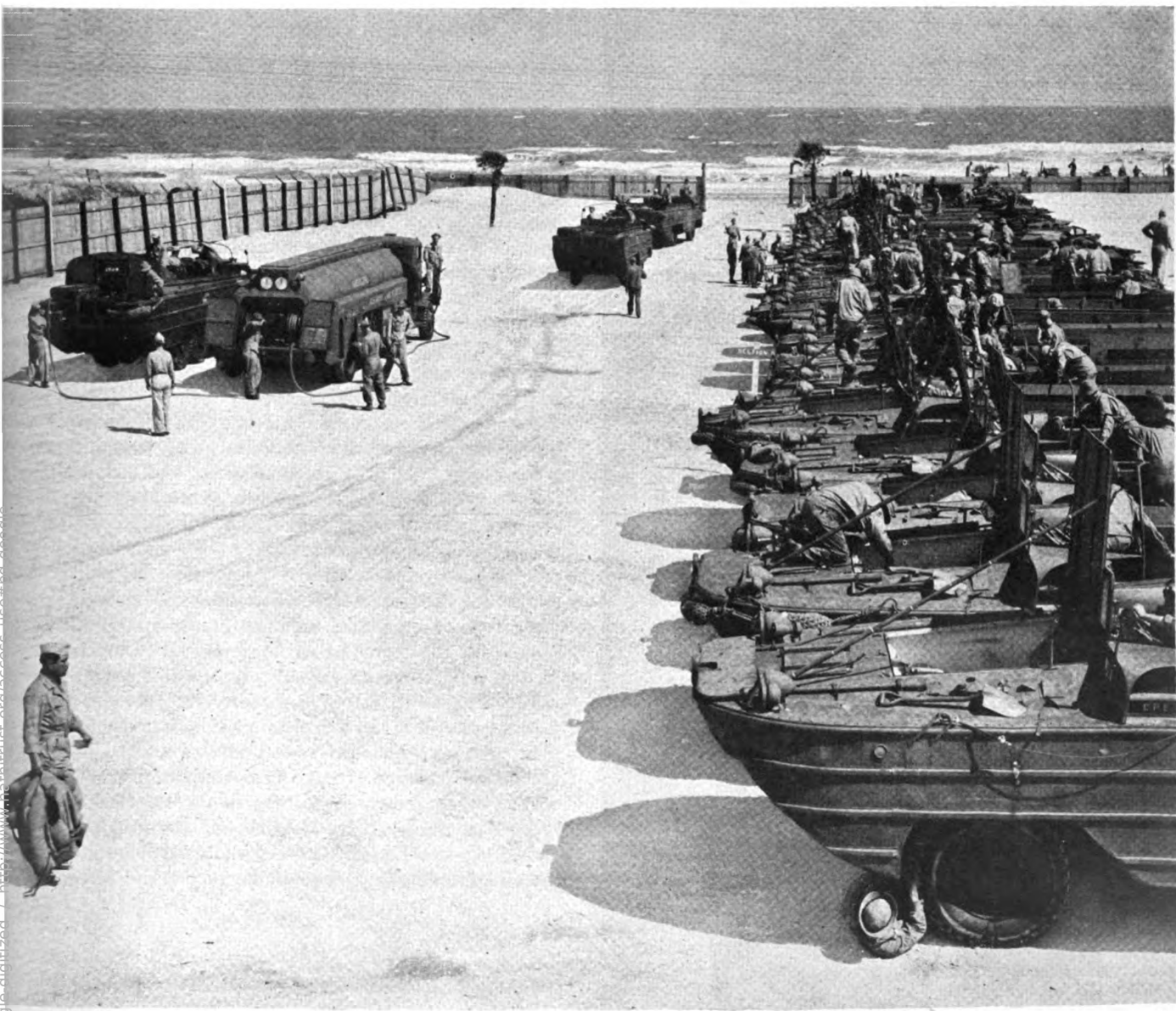
or under fire. An old freighter was used as a training ship for a time, and later a barge with LIBERTY ship rig was used. The unit training of each company included the execution of three 2-day continuous ship-to-shore cargo handling operations, the personnel working 12-hour shifts. Each company was required to participate in several bivouacs, since this was the best means of placing the unit entirely on its own responsibility, teaching officers and noncommissioned officers their duties in the field, and instructing operating and maintenance personnel how to meet problems as they arose.

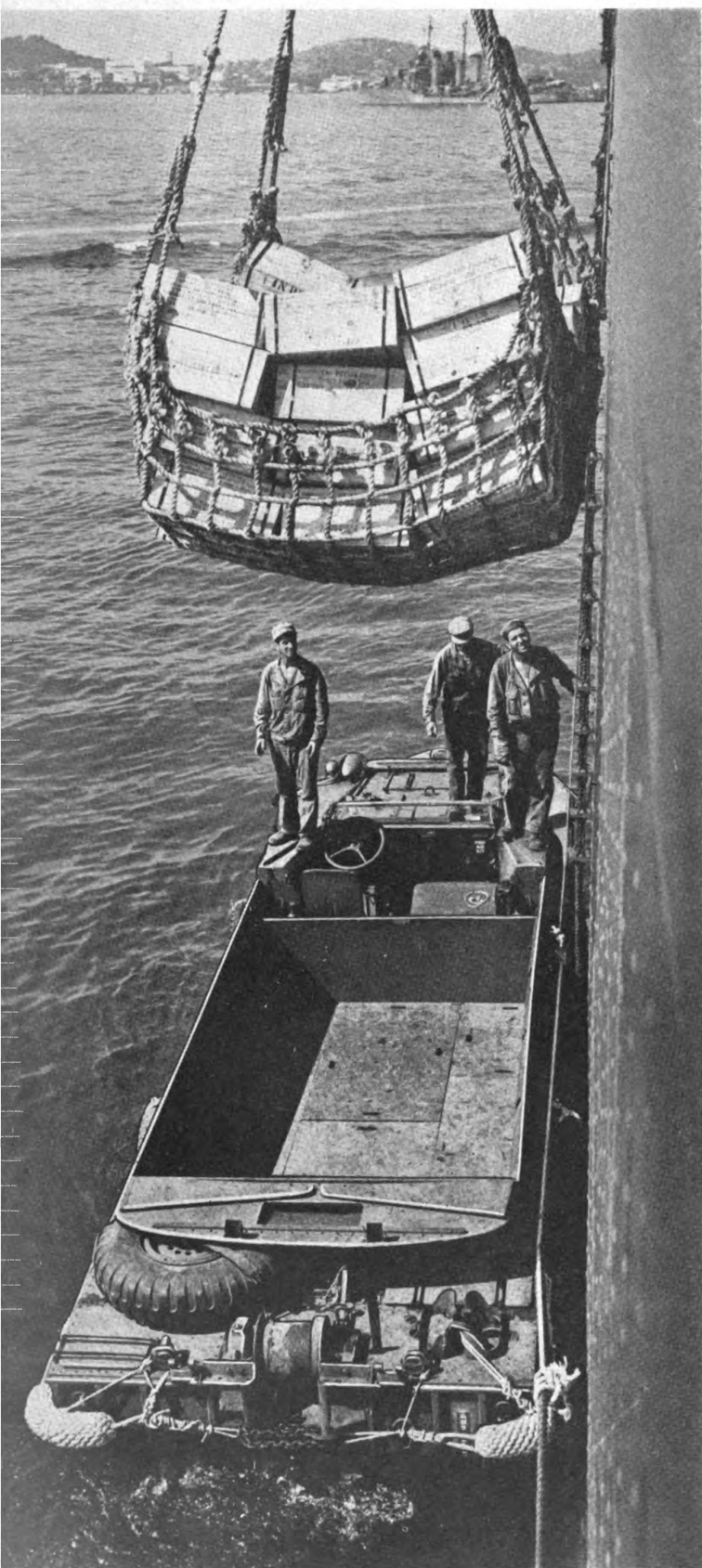
The training at Camp Gordon Johnston was conducted by an amphibian truck training regiment. A detachment from

an Engineer special brigade, which had been in training there, handled the first group of Transportation Corps trainees, and some of this Engineer personnel continued as instructors. The Transportation Corps personnel which subsequently was detailed to the training regiment included some who had served as instructors at the Charleston school, and others who were selected because of their previous automotive experience or their record as trainees in earlier groups.

Reports from the theaters were analyzed to determine the shortcomings of amphibian truck companies which had seen service overseas, and appropriate adjustments were made in the training. Fifty vehicles were assigned to each company

Practice in maintenance was a highly important feature of the training of an amphibian truck company.





in the field, and the objective of the training was to make the unit completely capable of the operation and maintenance of this fleet under field conditions.

Originally, the training period for amphibian truck companies at Camp Gordon Johnston was 17 weeks—6 for basic military, 8 for basic technical, and 3 for unit training. Subsequently, the over-all period was increased to 20 weeks, and finally, when colored enlisted men were assigned to these units, it was increased further to 26 weeks. The colored troops received at the unit training center were for the most part not experienced drivers, which was one of the original basic requirements. Moreover, most of them were without mechanical background, which made it difficult to bring them to a point of maintenance proficiency desirable for personnel charged with the care of so difficult a mechanism as the amphibian truck.

Other Transportation Corps Training

Traffic regulation groups were required in theaters of operation to insure the prompt and orderly movement of supplies and the efficient use of transportation equipment in the communications zone. They consisted of teams which were specifically trained to deal with railway, highway, inland waterway, and air traffic. Generally, they were assigned for operation to base, intermediate or advance sections, and the types of teams comprising a group depended upon the nature of the traffic in the section where it served. Fifteen such groups were activated in the zone of interior and received their training at Camp Plauche, and fifteen were activated overseas. One traffic regulation battalion was activated overseas. The total authorized personnel of these organizations was 1,405 officers and 7,771 enlisted men.

Regulating stations were not Transportation Corps units, but their table of organization was drawn up by the Transportation Corps. They operated in advance of the communications zone and their mission was to regulate the flow of supplies to the armies. Four such units were activated in the zone of interior and trained at Camp Plauche, and one was activated overseas. Altogether they had a total authorized strength of 215 officers and 711 enlisted men.

Base depot companies handled Transportation Corps supplies in the theaters. In the beginning, they were organized to deal primarily with railway supplies and were trained by railroads in the United States as were the units of the Military Railway Service. Later, their organization was revised and their training broadened so that they would be prepared to handle all Transportation Corps supplies. The units then received their technical training in the handling of railway supplies at the Marietta Holding and Reconsignment Point, and in the handling of port and marine supplies at the Voorheesville Holding and Reconsignment Point. Ten such units

Lowering cargo into an amphibian truck required skillful and careful operation.

were activated in the zone of interior and nine overseas, with an aggregate authorized strength of 95 officers and 2,396 enlisted men.

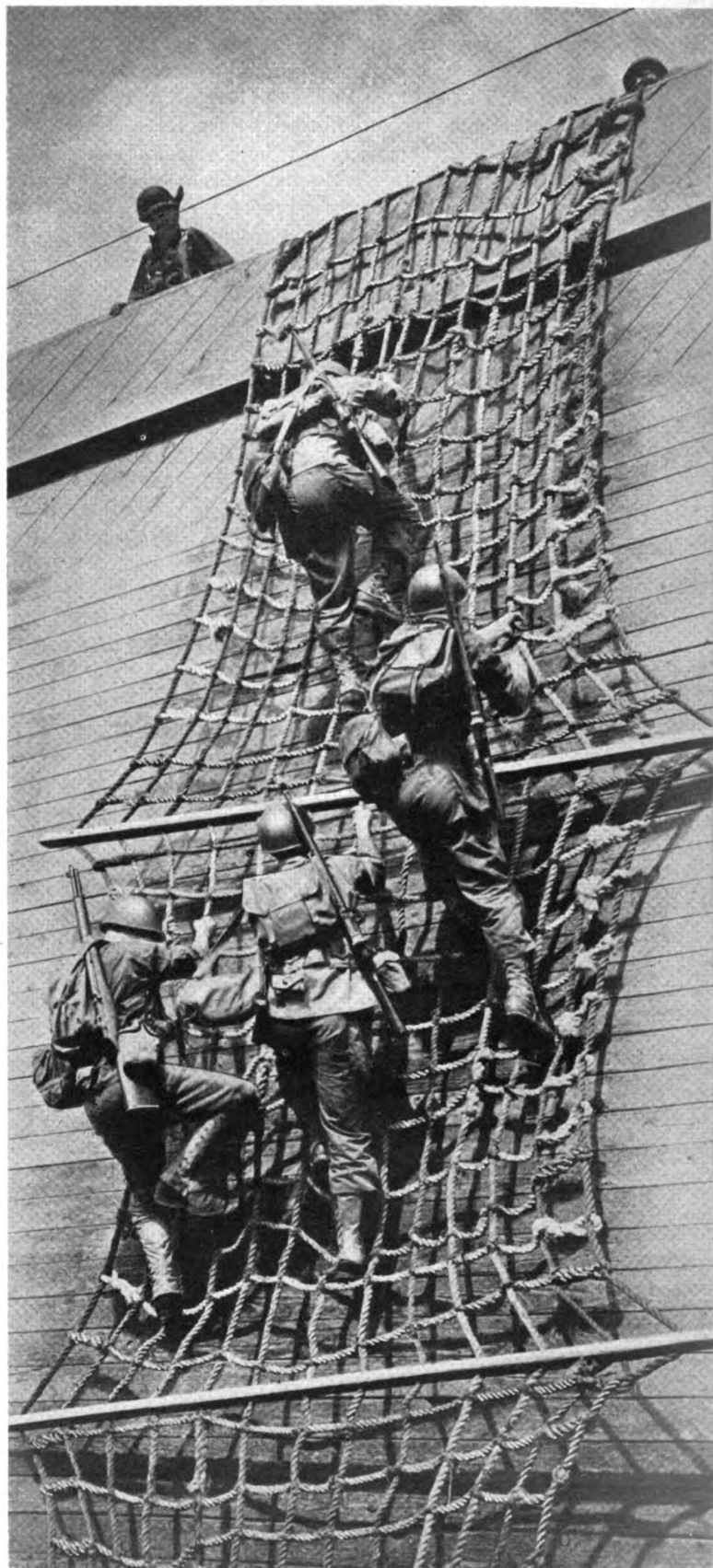
Army marine ship repair companies were organized and trained to operate the shops on repair ships which moved from place to place and remained on location long enough for the performance of whatever marine repair or heavy maintenance work was required. The need arose from the fact that Army vessels were required to operate at ports and beaches where there never had been marine repair facilities, or where such facilities had been destroyed. Of the eight units which were activated in the zone of interior, five were trained at the San Francisco Port of Embarkation and three at Camp Gordon Johnston. Former shipyard workers were obtained for these units through Selective Service, so that little technical training was necessary. Two Army marine ship repair companies were activated overseas. Altogether the ten units had an authorized strength of 50 officers and 1,096 enlisted men.

Port marine maintenance companies were Transportation Corps units organized and equipped to effect repairs on ships at oversea ports. Their mission was like that of the Army marine ship repair companies, but they were stationed on shore. Nine units were activated in the zone of interior, and four overseas, with a total authorized strength of 78 officers and 2,652 enlisted men.

Numerous other small units of various types were organized, activated, and trained by the Transportation Corps, which need not be detailed. The last new type which the Corps was called upon to organize was the floating spare parts depot. Two such units were activated at Camp Plauche in June 1945, with a total of 10 officers and 110 enlisted men. They received their technical training at the Montgomery Holding and Reconsignment Point, under the instruction of a team of officers sent from Camp Plauche. Their mission was to stock marine and rail spare parts on vessels equipped for that purpose, and issue them to island installations. Each unit was equipped with two amphibian trucks and two launches, with which to make ship-to-shore deliveries.

The tables of organization and equipment for many Transportation Corps units were embraced in a composite table, designated T/O & E 55-500. The troop units needed in the several theaters differed greatly, both as to type and size. Sometimes these units were required to perform separate operations, sometimes to supplement standard units, and sometimes to serve as components of a new organization not covered by an existing T/O & E. The composite table embraced more than 60 units, or teams, of technicians, covering a wide range of functions. Use of it enabled the oversea commanders to select units which had been carefully organized in respect to both personnel and equipment, avoided calls for

Transportation Corps troops in training learned how to "go over the side."



a great variety of new and experimental organizations, and conserved manpower.

The units embraced in the composite table of organization were grouped into sections. There were five types of headquarters units for administrative purposes, and five types of mess teams. There were two land vehicle repair teams, and thirteen maintenance and repair units to deal with marine and rail equipment. Three types of stevedore units were provided to operate as labor and technical personnel in the loading and unloading of vessels. Amphibian truck units were provided in three types, supply handling units in four types, and traffic regulating units in four types. There were two types of train operating units, eleven types of crews for small boats, and nine types of crews for marine tractors, floating cranes, and barges.

The training of loss replacements for Transportation Corps units was established first at Camp Plauche, beginning in April 1943. The original capacity was for 3,000 replacement trainees, but the heavy demand from overseas required that it be increased to 5,200. The men training for assignments to port companies took both basic military and technical training at Camp Plauche, while those training for rail units took basic military training at Camp Plauche, and technical training at other posts—initially at Camp Claiborne, Louisiana, or at Camp Shelby, Mississippi, and after July 1944 at Fort Francis E. Warren, Wyoming. Beginning in June 1944, some port company replacements were trained at the Army Service Forces training center at Indiantown Gap, Pennsylvania.

The increasing number of harbor craft companies and amphibian truck companies in operation necessitated the establishment of a replacement training center at Camp Gordon Johnston in December 1943. Generally speaking, the men received basic military training at Camp Plauche before assignment to Camp Gordon Johnston for basic technical training. However, some specialists were given technical training at Camp Plauche because it had the better facilities in those particular lines, and later some trainees received their basic military training at Camp Gordon Johnston. It did not become necessary to establish replacement training centers for other Transportation Corps units, because of the smaller number of men assigned to those units and the consequent light demand for replacements.

During the war, 15,032 replacements were trained for port units, 6,268 replacements for rail units, and 1,491 replacements for marine units—a total of 22,791.

Postwar Training Plans

From the foregoing discussion of the major Transportation Corps troop units, it will be clear that the training program was developing constantly, that the training was scattered over many installations, and that training functions were shifted frequently from place to place. This was due in part to the fact that the Transportation Corps was not established until after the country went to war, that no adequate estimate had been made of the overseas requirements for transportation

troops, and that emergency measures had to be taken to meet those requirements as promptly as possible. Out of the experience of about three years, a number of conclusions were drawn.

It was evident that there would be a definite advantage in training various types of units at the same installation rather than at separate training centers. For example, there was a strong interrelationship between the work of port companies, amphibian truck companies, and harbor craft companies. During the war they had to learn to work together after they arrived overseas. Such teamwork should be comprehended in the training, and that can be done only when the units are trained at the same place. This coordination of training can be carried out to a lesser degree with some other Transportation Corps units.

The Transportation Corps has recommended that for postwar purposes a single installation be utilized for the training of port, marine, and railway organizations. It has recommended also that this installation be under the direct control of the Chief of Transportation. Better results will be achieved if the training is wholly planned and directed by the service which makes transportation its specialty. The best qualified personnel of the Transportation Corps will be available for use as instructors. Continuous supervision by transportation technicians will be much more effective than occasional inspections have been in holding the training to the desired standards. In the last analysis the Transportation Corps is responsible for the effectiveness of the units when they arrive overseas and it should have full charge of their preparation for that service. The Transportation Corps School, for officers and officer candidates, also could be embraced in this installation with advantage during the postwar period.

Schooling of Commissioned Officers

The fact that the Transportation Corps was a new service, with officer personnel drawn entirely from other services and from civil life, imposed upon it a heavy obligation in regard to the schooling of that personnel. Such schooling followed three lines. Orientation was necessary to acquaint officers with the organization and functions of the Corps, the Office of the Chief of Transportation, and the field installations. Military indoctrination and training in basic subjects were essential to those who had been commissioned directly from civil life, or had been called to active duty from the Reserve Corps. Specialist schooling was required by officers who were to take positions involving technical knowledge of Transportation Corps activities.

In the beginning, such schooling took place at the field installations themselves, and particularly the ports of embarkation, since they required the greatest number of officers and covered the widest range of activities. The ports developed competent training divisions and extensive curricula. They had the advantage of having many experienced Army officers and specialists on the ground. The greatest disadvantage of this mode of training was the lack of uniformity as between

the several installations, and the lack of balance in certain training programs. Holding classes in off-hours also was unsatisfactory. Full-time attention on the part of both instructors and students was found desirable.

To meet this need the Chief of Transportation established two schools, both of which began classes in October 1942. The Atlantic Coast Transportation Corps Officers' Training School was at Fort Slocum, New York, under the commander of the New York Port of Embarkation. It continued in operation until October 1944 and trained 2,122 officers, drawn chiefly from the eastern part of the United States. The Pacific Coast Transportation Corps Officers' Training School was at Camp Stoneman, California, under the commander of the San Francisco Port of Embarkation. It was in operation up to February 1944, and trained 914 officers, drawn principally from the Pacific coast States. The courses, which were devoted to orientation and military indoctrination, varied from four to six weeks in length. A permanent staff was maintained at each school, and special lecturers were called upon.

Technical training relating to water transportation continued at the ports of embarkation, which were particularly well situated to handle it. It dealt with such subjects as port administration, transport complements, marine maintenance and repair, cargo security officers duties, stevedore officers duties, postal officers. This type of training was extended by the officer department of the Transportation Corps School which was established under the commander of the New Orleans Port of Embarkation in February 1944. The master program at that school provided one week of orientation and four to seven weeks of specialist training in traffic regulation for railway, highway, air, and inland waterway traffic, water operations at ports, and stevedore operations. The officers who were commissioned for the Military Railway Service came from the railroads and did not require basic technical training.

Officer Candidate School

The rapid expansion of transportation activities in the zone of interior and overseas, and the fact that most officers who had been transferred from other services or commissioned from civil life were older, resulted in a shortage of second lieutenants. This led to the establishment of an officer candidate school in October 1942. The principal need then was for administrative officers, and the establishment and supervision of the school were handled by the Commandant, Adjutant General's School, Fort Washington, Maryland. It was known as Army Administration School, Branch No. 4, and was located at Mississippi State College, Starkville, Mississippi. The school was transferred to the control of the Chief of Transportation in January 1943.

Some candidates who were qualified only for limited service were accepted. College training or experience in business administration, personnel management, industrial engineering, public utilities, or allied fields was desired. The first eight weeks of the twelve weeks course were devoted principally to administrative subjects, such as supply, correspondence, mili-

tary law, courts martial, mess management, reports, and duty rosters. Transportation subjects were dealt with during the last four weeks. At the outset, completion of basic military training was waived, but in the spring of 1943 it was made a prerequisite.

As time went on, the lack of instruction by experts in the transportation field was felt. Leadership deficiencies were pronounced in many candidates. Both points were important since the demand was swinging away from administrative officers to men qualified to lead troops. Mississippi State College itself had certain drawbacks, since it had only a branch railway line, little contact with highway and air transportation, and no water transportation. It also lacked the facilities for adequate military training. In consequence, the school was moved after six classes had been completed and 1,333 candidates graduated.

The Transportation Corps Officer Candidate School then was established at the New Orleans Staging Area, where it received its first class in June 1943. By that time, the course had been lengthened to 17 weeks. The new location provided contact with all forms of transportation, and full facilities for military training. More emphasis was placed on graduating second lieutenants who were qualified for field duty, and transportation subjects received greater attention. The screening of applicants and the weeding out of unlikely candidates became more severe.

In February 1944 the OCS was moved to the New Orleans Air Base, and became the officer candidate department of the Transportation Corps School which was established at the air base in that month. Up to 30 June 1945, the OCS had completed the instruction of 39 classes which had enrolled a total of 7,859 candidates. Of this number, 6,668 candidates had been graduated—about 85 percent.

Schooling of Enlisted Men

In certain fields enlisted men required a higher grade of technical schooling than the training centers were able to provide. In most instances the men were sent to schools operated by the manufacturers of the equipment in which they were required to become specialists. The courses dealt with such subjects as the mechanics of amphibian trucks, Diesel locomotives, marine Diesel and gasoline engines, marine maintenance and repair. They ranged in duration from two to eight weeks.

The students for the most part were drawn from units in training at Camp Gordon Johnston, and when they had finished the courses they returned to their units. About 825 enlisted men were given such specialized schooling, which was valuable to the Transportation Corps because of the high grade of instruction and the excellent facilities which the manufacturers could make available.

The Transportation Corps, because of the wide range of its activities, embraced more military occupational specialties than any other technical service. It was directly responsible for the schooling of enlisted men in 128 such specialties. In addition, Transportation Corps personnel was assigned to other technical services for courses which they conducted.

SECTION VII

ADMINISTRATIVE PROGRESS

The vast expansion of Transportation Corps operations naturally was accompanied by a great increase of administrative functions and problems. In the latter field, no less than in the former, the newness of the Corps imposed certain handicaps. The personnel under the control of the Chief of Transportation was inadequate from the beginning, and never really reached the level justified by the responsibilities. Procedures had to be developed hastily to meet urgent needs, and then refined as opportunity was afforded. The organization had to be based in the beginning upon inherited elements, and gradually adjusted to provide proper relationships and coordination. In accomplishing many needed improvements it was necessary to win the approval of higher echelons which had no direct knowledge of technical transportation matters and sometimes did not fully understand the requirements and problems.

Personnel

When a Chief of Transportation was appointed in March 1942, as the first step toward an integrated Army transportation service, the combined military and civilian personnel placed under his control numbered approximately 33,000. By 30 June 1945 such personnel had increased to 434,998. Of this total, 194,123 were employed at headquarters or at field installations in the zone of interior, 50,582 were employed on ships and small boats under Army control, and 190,293 were embraced in troop units which were stationed on shore overseas or were in training. The total figure broke down as follows:

Officers.....	28,347
Enlisted men.....	269,278
Civilian employees.....	105,347
Prisoners of war in the U. S.....	12,358
Contractors' employees.....	19,668
Total.....	434,998

One of the most urgent problems was to find commissioned officers with sufficient technical qualifications to fill key posts in the Office of the Chief of Transportation, at installations in the zone of interior, and with the forces overseas. Some officers were transferred from other services, some were developed at the officer candidate school, but more than 10,000 were commissioned directly from civil life. The railways,

motor carriers, steamship lines, and other industries were themselves hard pressed for personnel, but they were willing to dispense with a sufficient number of men to meet the Army's urgent needs. These officers occupied important posts throughout the organization, and without their experience and technical knowledge the Transportation Corps would have been severely handicapped.

A consistent effort was made by the Military Personnel Division to keep officers so assigned that their talents would be utilized to the maximum. During the rapid build-up of officer personnel in 1942 and 1943, not as much care could be taken with original assignments as was desirable. Later, the procedure was improved with beneficial results. During the year ended 30 June 1945, the Assignment Review Board reviewed 6,300 qualification records, which led to further study of 971 duty assignments and resulted in 58 reassignments.

The necessity of releasing from operating assignments in the zone of interior all military personnel qualified for overseas service, created an especially difficult situation for the Chief of Transportation because of the technical knowledge which those men possessed. However, this War Department policy was given effect as rapidly as possible, and in due time all such men were replaced by limited service personnel, men who were over age or men who already had seen service overseas.

The civilian personnel which was assembled also included many men of technical and administrative skill, drawn largely from the transportation industries, who made a substantial contribution to the accomplishments of the Transportation Corps in all its departments.

In the lower grades of civil service the problem was to engage and retain the required number. Extensive recruiting was resorted to, but for a time the turnover was so great as to largely offset the effort. By careful attention to employee relations, adjustment of classifications when warranted, the offering of prizes to stimulate constructive interest, and on-the-job training to more adequately fit the employees for their work and make them satisfied in it, the rate of separation was appreciably reduced and the level of efficiency raised.

Civilian marine personnel for Army transports and small boats constituted a separate problem. Although constant vigilance was required to keep the Army's passenger and cargo transports fully manned, this was accomplished without serious difficulty, due in part to the fact that the number of ocean-going vessels directly operated by the Army was fairly

constant. On the other hand, finding crews for small boats which were being built in large numbers was beset with many difficulties, stemming from the fact that the service was not especially glamorous and work on shore or on large ships was always available. The Industrial Personnel Division carried on widespread recruiting campaigns, and provided training for men who did not have adequate experience, in order to meet this growing need.

The Director of Personnel, and the Military Personnel Division and Industrial Personnel Division which functioned under his supervision, were under constant pressure from the field for additional manpower. It was evident soon that some standard method of evaluating requests and fulfilling or denying them was necessary. Accordingly, a personnel control unit was established in July 1943, and methods of work measurement were evolved, with which it was possible to control personnel allotments efficiently and equitably among the several installations.

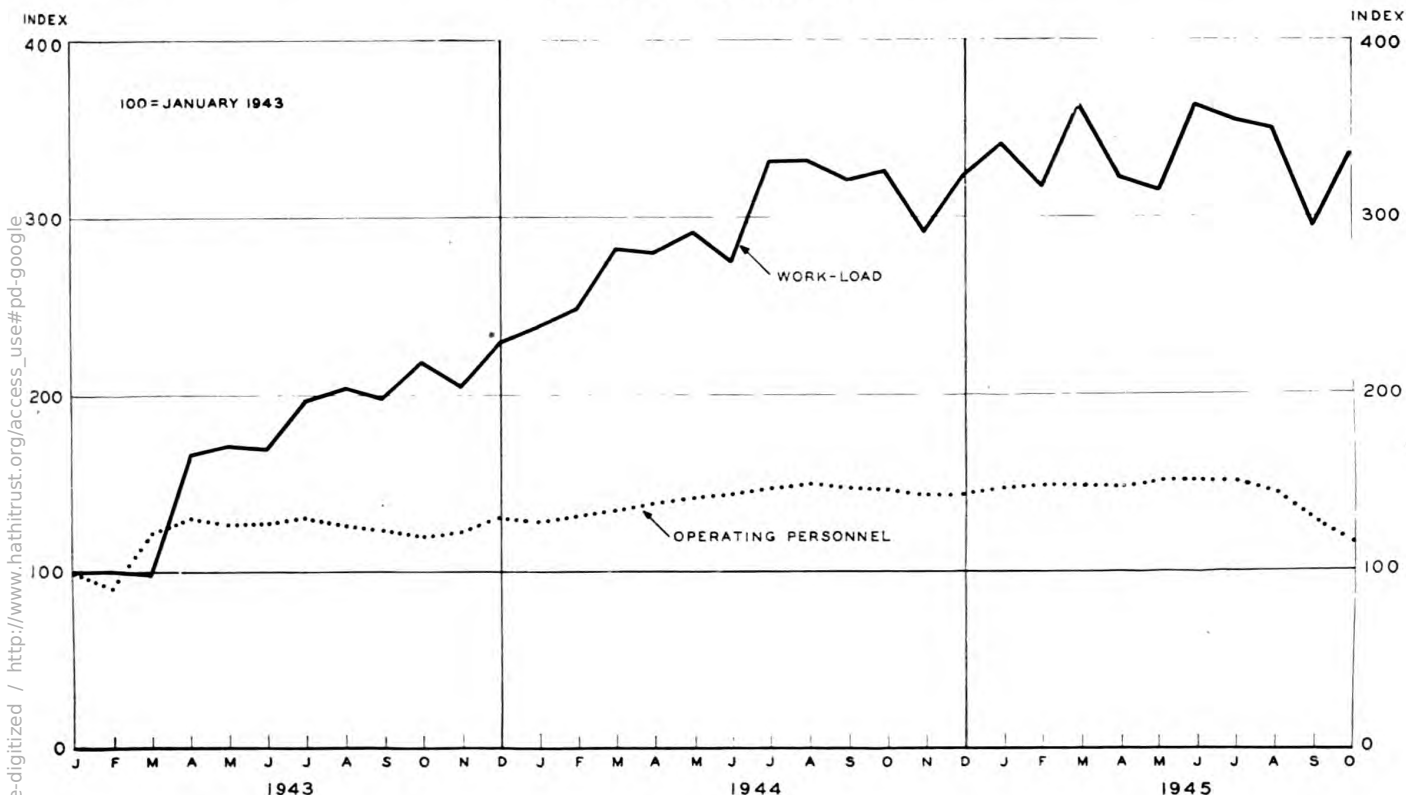
The work load of the Transportation Corps increased throughout the war. Its personnel also continued to increase, but not nearly in the same ratio. Work load computations, based on the number of troops and the tonnage of Army cargo handled inbound and outbound at the ports, and using January 1943 as 100, resulted in a work load index of 363 for

June 1945. The operating personnel index, based on January 1943 and including all Transportation Corps personnel in the zone of interior except that assigned to troop units, stood at only 151 in June 1945. The basis used for computing the work load index was carefully checked and found to reflect with reasonable accuracy the trend of the over-all burden carried by the Transportation Corps.

The Transportation Corps took a broad view of its responsibilities in regard to industrial relations affecting contractors' plants and the transportation industries. Any threatened or actual interruption of work, which might affect the movement of Army supplies or troops, or the production of Transportation Corps matériel, was considered within its purview. Each transportation zone had an industrial relations officer to maintain contact with the situation throughout the zone, report developments to the Industrial Personnel Division, and deal with matters as directed. Lacking authority for direct action, the industrial relations officer endeavored to use his influence with the parties to the dispute, and also solicited the assistance of the National War Labor Board and the state labor arbitration boards. When strikes actually occurred affecting a carrier, he undertook to arrange for the continuance of sufficient service to keep military traffic moving.

CHART NO. 15

MONTHLY INDEXES OF TRANSPORTATION CORPS OPERATING PERSONNEL AND WORK-LOAD,
IN THE ZONE OF INTERIOR





Troops assigned to transferring freight from railway cars to docks were shown the hazards involved and the safety measures to apply.



Equipment employed in fighting fires in ships' holds were tested regularly.

Intelligence and Security

The intelligence and security functions of the Chief of Transportation developed gradually during the war. Following the Army reorganization in March 1942, responsibility for both intelligence and security at Class IV installations was with the service commands. This arrangement did not work out satisfactorily at ports of embarkation. The personnel assigned to the work lacked knowledge of port operations, and they were hampered by restrictions peculiar to their organization. Safeguarding a waterfront ammunition loading terminal, for example, was a very different matter from safeguarding a post or camp. Moreover, the nine service commanders placed different interpretations on the regulations. In time, it also became apparent that the service commands were not in as good a position as the ports of embarkation to screen prisoners of war, deal with seamen accused of subversive tactics, collect foreign information from arriving military and civilian personnel, and perform other intelligence functions. Likewise, developments disclosed that the various types of investigations required by the ports could be made most satisfactorily by personnel selected and controlled by the port commanders.

As the result of this experience, the Chief of Transportation was made responsible, progressively, for the supervision of internal security, intelligence, and investigations at the port

installations under his control. Probably no other type of Army installation offered so wide and varied a field for the exercise of these functions. The fact that the facilities of the larger ports were widely scattered added to the task. In order to fulfill these responsibilities properly, an organization was built up embracing 170 fire companies, 6,000 military police, 7,000 auxiliary military police (militarized civilian guards), and 200 trained investigators.

As part of the internal security program, a highly effective system of identification was established for persons permitted to enter port areas, and standards of fire protection and other security were set up. Police radio systems were installed at all ports to add to the efficiency of the security forces. An agreement was made with the Coast Guard defining the responsibilities of that agency and those of the Chief of Transportation, in order to avoid duplicating efforts and obtain best results from the joint endeavor to a common end.

With traffic increasing rapidly, an intensification of the safety program was undertaken in the spring of 1944. A number of the occupations at the ports of embarkation are hazardous, especially that of the longshoreman. A special office was set up in New York to supervise this program, and experienced personnel was engaged. The results were progressively good. In 1943 the average rate of accidents per million man-hours of exposure was 20. In 1944 it dropped to 15, and in 9 months of 1945 it was 7.

Counterintelligence and security intelligence investigations at ports of embarkation, which became a responsibility of the Chief of Transportation early in 1945, were placed in charge of an Intelligence Agency, with headquarters in Baltimore. This agency began functioning in June 1945, and in five months conducted over 2,000 intelligence investigations and supervised 4,600 criminal investigations. Among the results was the recovery of an average of \$10,000 worth of Government property monthly.

The Intelligence and Security Division in the Office of the Chief of Transportation, in addition to supervising the activities in the field, assembled information from all available sources for the use of the various elements of the Transportation Corps. It published an internal security bulletin dealing with the security of waterfront facilities, and a positive intelligence bulletin covering matters of world-wide scope which bore upon the work of the Transportation Corps.

Legal Matters.

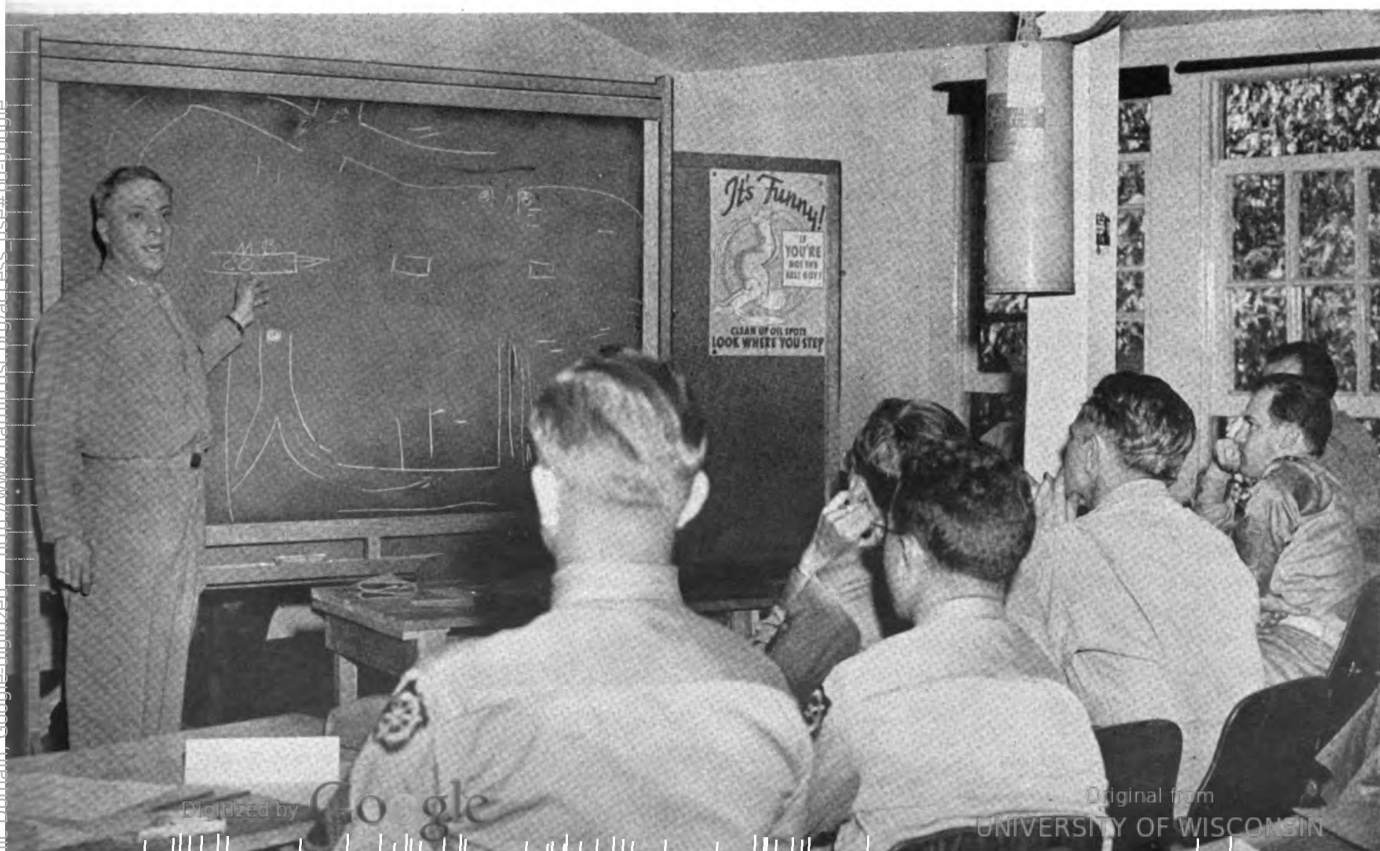
The Legal Division in the Office of the Chief of Transportation served in a staff capacity in connection with all matters having a legal or a legislative aspect. In the beginning it endeavored to handle matters of this nature arising in the field installations by correspondence or telephone. Eventually, however, it became necessary to establish legal branches in all field procurement offices and to have contract review branches set up at the ports of embarkation. The presence of legal officers while contracts were being negotiated enabled

the contracting officers to have the benefit of legal advice on each step of the transactions, and left them free to devote their personal attention to the strictly business aspects.

While standard forms generally were available to cover the major features of contracts for the procurement of equipment and supplies, special forms were required in many instances for the procurement of services. Special contracts were worked out covering stevedoring, and they were different at the several ports because of the widely differing local conditions. Stevedoring contracts were placed on a fixed-price or commodity rate basis, which worked out advantageously from the standpoint of work performed, and was adopted later by other Government agencies. A master ship repair contract was developed jointly with the Navy and the War Shipping Administration, which greatly simplified and standardized contracting for repair work by the three agencies. A fixed-price freight handling contract was devised for the holding and reconsignment points, which arranged for a considerable part of their freight handling to be done on a contract basis. Special forms of contract were prepared for the leasing of Government-owned buses to contractors for the transportation of war workers between their homes and their jobs. The arrangements between the Transportation Corps and a number of the American railroads for the training of military personnel on the railroad properties were covered by special contract forms.

Under the standard form of Government contract, disputes as to questions of fact were resolved by the contracting officer, if possible. If the findings of fact were unsatisfactory to the contractor, he might appeal to the Secretary of War's Board

Drivers of vehicles at Transportation Corps installations were instructed in the avoidance of accidents.



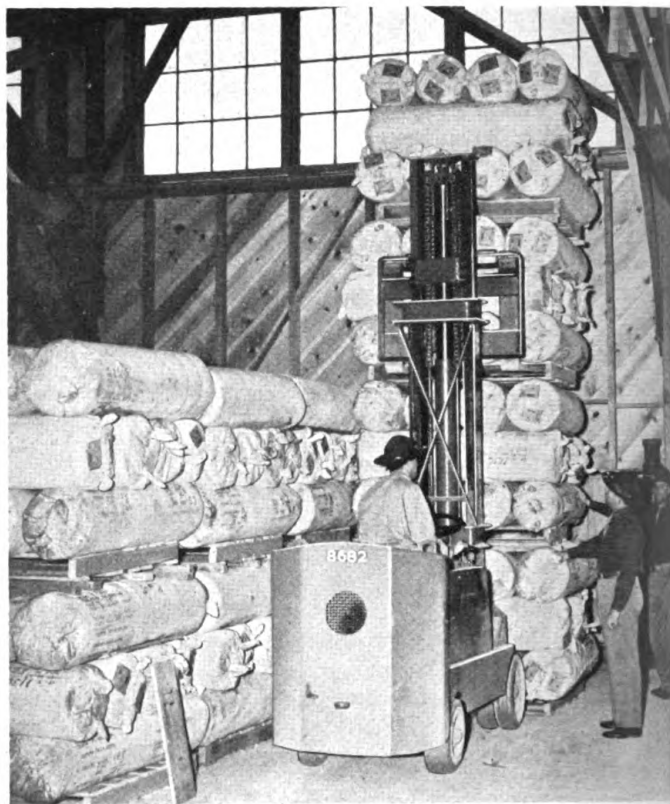
of Contract Appeals. The legal officer assisted the contracting officer in preparing his findings of fact and in submitting his case to the Board, and also in drafting the contractual instruments necessary to the settlement of any claims. Similar legal assistance was given when claims arose from the Government's assumption, in lump sum ship construction contracts, of the risk of loss of materials on hand or vessels under construction. The Transportation Corps regulation concerning such claims provided for investigation by the contracting officer, review of the claim and the findings by the Legal Division, and adjustment of the price by a supplementary agreement. The division was extensively concerned with the legal aspects of claims and settlements arising out of the termination of contracts.

The majority of tort claims were handled by The Judge Advocate General, but the Chief of Transportation also had responsibilities in that direction. Army regulations provided for the investigation of claims arising out of marine casualties by officers qualified in admiralty law. Such officers were appointed at all ports of embarkation and at the larger oversea ports, and they carried on their work with the advice and counsel of the Legal Division.

Arrangements were made with the War Shipping Administration for the insurance of vessels owned or operated by the Army against certain liabilities cognizable in admiralty jurisdiction, and claims covered by such insurance were referred to the War Shipping Administration, but any other marine claims were settled by the Transportation Corps installations involved. Claims for damage to property in transit by common carriers were investigated by the surveying officers at destination and settled through the office of the Army Service Forces' Fiscal Director, but questions as to technical aspects or transportation law frequently were referred to the Office of the Chief of Transportation for comment.

Pursuant to the Royalty Adjustment Act of 1942, investigation of all contracts was made to determine the reasonableness of any patent royalties included in the contract price. Substantial refunds of excessive royalties were obtained by agreement, or by order if necessary. The Legal Division also took steps for the protection of the Government's interest in possible patents by officers, enlisted men, or civilian employees, by investigating such inventions and, when they were considered patentable and of use to the Government, giving assistance in the filing of patent applications.* Claims of patent infringements were investigated, and licenses were obtained for the use of patents by the Government or its contractors.

All pending legislation which would, if enacted, directly or indirectly affect the activities of the Transportation Corps, was reviewed by the Legal Division and reports were made to the interested divisions with appropriate references to existing law. Some highly important bills affecting transportation came before Congress during the war and care was taken to insure that the views of the Chief of Transportation were presented at the hearings. Some of these bills were opposed by the Transportation Corps and others supported. For example, opposition was registered against the bill to repeal the



To reduce the danger to operators of fork lift trucks, it was required that such trucks be fitted with overhead guards.



so-called land-grant railroad rates, since it would have added substantially to the transportation charges paid by the Army. Legislation authorizing the wartime waiver of the inspection and navigation laws in order to speed up the dispatch of vessels bearing troops or military cargoes, was supported.

Fiscal Matters

After the United States became involved in the war, the amount of money required to provide for the Army's transportation needs necessitated a complete revision of the method of preparing budget estimates, to portray the requirements more accurately and afford a better basis for defending the figures. This was accomplished in the spring of 1942, after which the operating divisions of the Office of the Chief of Transportation and the field installations were required to submit their requests in detailed form and with adequate justification for each item. As a matter of history, the obligations incurred during the war period were as follows:

Fiscal Year 1942.....	\$1,180,000,000
Fiscal Year 1943.....	1,921,412,216
Fiscal Year 1944.....	1,964,529,787
Fiscal Year 1945.....	1,927,118,642
Fiscal Year 1946.....	1,182,427,108 (est.)

A more workable system for the control of expenditures was developed. Because war conditions necessitated the most economical use of transportation under all circumstances, it was feasible to eliminate detailed central control of transportation expenditures, and open allotments of funds were made, with a considerable saving of work both in the field and in the Fiscal Division. Detailed control was delegated to the fiscal officers at the installations, who were responsible for keeping expenditures for transportation within the allotments and rendering proper accountings. Control of expenditures for equipment and supplies was accomplished by the Fiscal Division by making funds available only for items which were included in the War Department Supply Program.

Routine audits were made at field installations to determine the adequacy of information, the standardization of methods and the accuracy of costs, and special audits were made under certain circumstances. The administration of advance payments to contractors consisted of approval of such payments based upon the financial and technical ability of the contractors, control of the funds advanced through special bank accounts under depository agreements, and policing of the funds through periodical audits of contractors' records. Accountability for Government property furnished to Transportation Corps contractors was decentralized to the field procurement officers, who acted under the staff supervision of the Fiscal Division. The greatest problem in this regard arose from the necessity of reconstructing property records which were inadequately maintained during the early part of the war.

Contracts assigned to the Chief of Transportation by the Price Adjustment Board for renegotiation, after eliminating those reassigned, numbered 161 for the year 1942, 291 for 1943, and 241 for 1944. In 1942 the majority of the con-

tracts were for the construction of small boats. For the later years contracts for railway equipment, materials handling equipment, and a variety of supplies were assigned. Agreements were reached with all but two contractors, who objected to the principle of the Renegotiation Act. The agreements reached up to 30 September 1945 represented savings of over \$100,000,000 through cash refunds and recovered taxes.

The Fiscal Division had staff supervision over the settlement of terminated contracts. In collaboration with the procurement officers, termination organizations were established in the field procurement offices. Instructions were clarified, procedures were set up, and individuals were selected to receive training to better qualify them for the work. During field trips by representatives of the Fiscal Division, settlements which had been effected were reviewed to determine that they had been fair to both parties and that the records were in order.

Coordination of Field Installations

The rapid expansion of the field organization in the zone of interior has been outlined. Many new port and other field installations became necessary, and when once established they required frequent additions and improvements to their facilities. A consistent effort was made to keep the expansion commensurate with actual needs. The objective was to make no expenditures which could not be justified on a utilitarian basis. On the other hand, it was necessary to take prospective strategical developments into account, and make sure that the field installations, particularly the ports of embarkation, had the facilities and the equipment necessary to the proper performance of their missions. Responsibility for the necessary control and coordination in such matters resided with the Port and Field Agencies Division in the Office of the Chief of Transportation, which functioned under the Director of Operations.

That division also was charged with supervision of house-keeping and certain other operations at field installations, to insure that established policies were carried out uniformly and that effective methods were employed. Among the responsibilities of this nature was supervision of the food service program at installations and aboard the vessels which the Army operated, for which purpose an expert mess advisor was employed. Such matters as the establishment of uniform systems of control for supplies used at the ports and on the vessels, the development of programs for the salvage of lumber and other critical materials, and the formulation of procedures for handling baggage returned from overseas, were dealt with by the Port and Field Agencies Division, working in collaboration with the other divisions concerned.

The overseas supply activities at the ports of embarkation, described at some length in this report, were supervised and coordinated by a branch of the Port and Field Agencies Division. The work of this branch included liaison with the Army Service Forces headquarters in regard to matters of policy and procedure, study of the requirements of the overseas theaters in relation to the supply responsibilities of the

respective ports, and analysis of operating data to determine that the oversea supply divisions at the ports were functioning properly. In this connection, liaison was maintained with the Air Transport Command regarding the shipment of Army Service Forces matériel to the oversea theaters by air, and the activities of the ASF air freight regulating officers at ports of aerial embarkation were supervised.

The same care that was exercised in building up the field establishment was applied to the demobilization of it. Because of its responsibility for the return of troops and matériel to the zone of interior, the end of the war did not involve a sharp reduction in the general level of activity in the Transportation Corps, as it did in other technical services. Nevertheless, measures were taken promptly to reduce staffs, inactivate installations, and dispose of excess real and other property as rapidly as might be consistent with the work which the Transportation Corps still was required to perform. With this in view, a Demobilization Committee was appointed immediately following VJ-Day, with the Director of Operations as chairman, and the Chief of the Port and Field Agencies Division as vice-chairman.

Administrative Control

In the attempt which was made consistently to promote efficiency throughout the organization, the Control Division played an important role. The other divisions and the field installations were in no sense relieved of responsibility for progress in that direction, but the Control Division assumed an over-all supervision, and since in many instances improvements in organization, management, and operation involved a number of elements of the Transportation Corps, it was the coordinating agency. In keeping with the nature of its mission, the Control Division reported directly to the Chief of Transportation.

Basic to the subject of efficiency was a system of statistical reporting which revealed trends in the volume of traffic handled by the Transportation Corps and its various installations, the progress achieved in improving operations and the tie-in of its activities with strategical developments. Regular monthly reports were issued, and special studies were prepared as the circumstances required. Two illustrations may be cited. Because of the critical shortage of railway rolling stock, it was necessary to obtain the fastest possible release of freight cars at Army installations. A periodical analysis of the operation of more than 200 freight handling points provided a basis for comparing their performance and pressing for better results where this was found desirable. Studies of the utilization of the deadweight and cubic capacities of the cargo vessels loaded by the Army revealed the ports and the types of cargo which were presenting the greatest problems. In all studies the advice and collaboration of the interested operating divisions were utilized.

Statistical reports prepared by other technical services or other divisions of the Army were carefully scrutinized for problems involving transportation, and the implications of these problems were brought to the attention of the proper authorities.

All angles of administrative management were kept under observation. The organizational set-up of the Office of the Chief of Transportation and the field installations was analyzed and improvements proposed. Standardization of organization for the several types of field installations was prescribed as far as differing local conditions would permit. A program of work simplification was undertaken with a view to obtaining maximum results from the personnel employed, involving a study of jobs requiring an expenditure of 22,750,000 man-hours per month and resulting in a saving of 3,594,000 man-hours per month. A strict control was exercised over recurring reports in order to eliminate those which were nonessential and effect simplification when possible in the remainder.

The procedures which were utilized during the early part of the war were either holdovers from peacetime operations or were hastily developed to meet the emergency, and they offered a wide field for improvement. The War Department Shipping Document, the Vendor's Shipping Document, the Theater Shipping Document, the methods of manifesting cargo and the system of code marking for oversea shipments were outstanding examples of improved procedures, in the development of which the Control Division cooperated with the other interested agencies of the War Department. Whenever uniformity between the Army and Navy was considered desirable, an effort was made to work out joint procedures, and the *United States Army and Navy Ocean Shipping Procedures Manual*, issued in March 1945, represented a substantial accomplishment in that direction.

While many elements of the Army Service Forces were interested in these procedural developments, the Transportation Corps had the most direct contact with them and therefore was designated as the agency to police the situation and report cases of noncompliance. This was done through officers at the ports of embarkation and in the transportation zones, who were thoroughly trained in the new procedures and in the policing methods. In order to evaluate the results, charts were prepared to show the relationship of the number of violations reported to the volume of traffic handled. A consistent improvement was disclosed.

Office of the Chief of Transportation

The organization which the Chief of Transportation established in March 1942 was essentially a merger of units which had been functioning as the Transportation Branch of G-4 and The Quartermaster General's Transportation Division. Some realignment naturally was necessary, but this had to be accomplished gradually in order to avoid interference with operations during a period when top performance was necessary. Actually, some adjustments which were desirable, purely from the standpoint of sound organization, were not undertaken during the war because that course seemed to be the more practical. It would have been of great advantage if the Army transportation organization during the peace period had been set up with a view to its suitability for expansion in case of war.

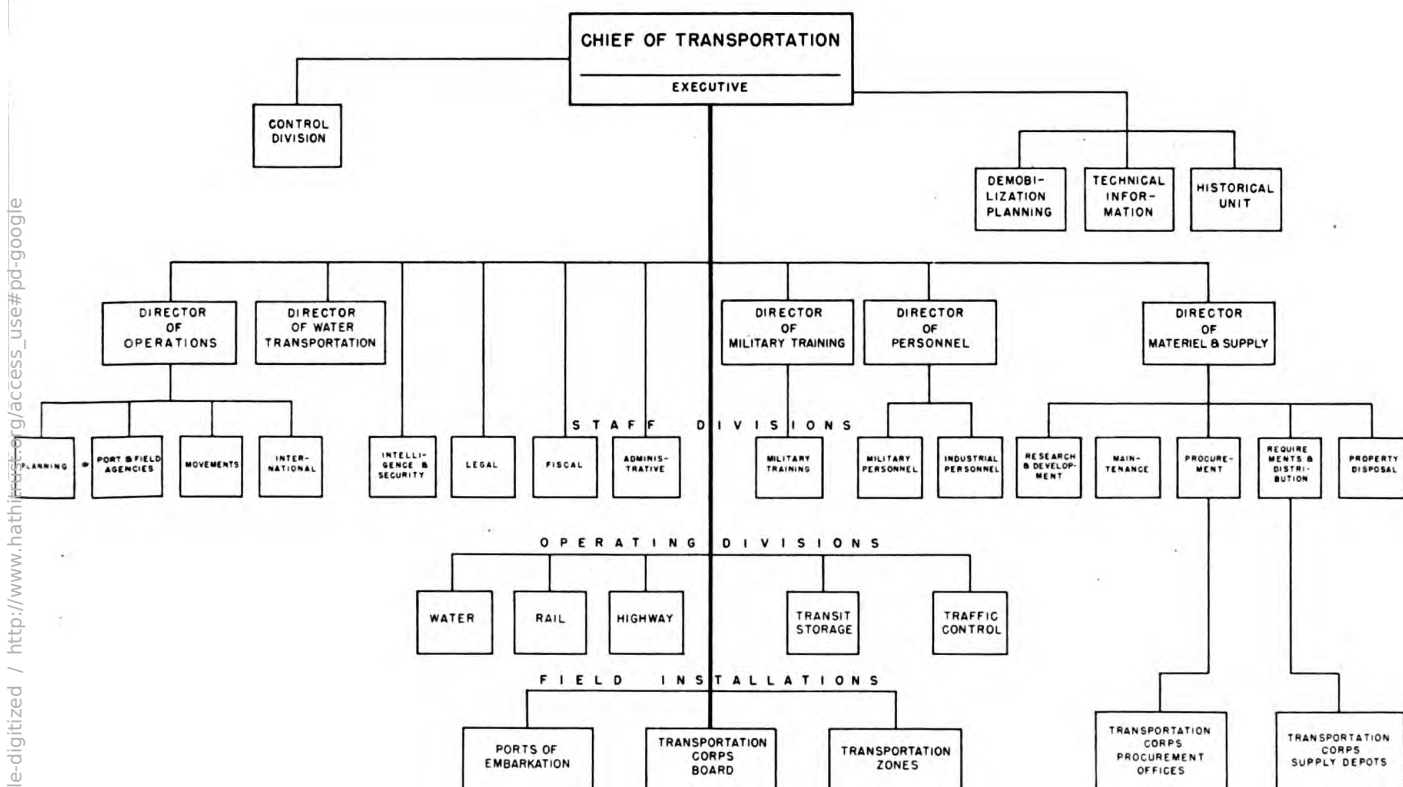
The organization chart of the Office of the Chief of Transportation, which accompanies this report, shows the set-up as it stood near the end of the war period. Five main fields of activity were headed by five directors. The Director of Operations, in addition to having immediate supervision of certain divisions, served to coordinate the activities of all of the operating divisions and to keep them in line with theater requirements. The Director of Water Transportation exercised general supervision over the ocean shipping activities of the Transportation Corps and represented the Chief of Transportation in many of his dealings with the Navy Department, the Maritime Commission, and the War Shipping Administration. The Director of Matériel and Supply supervised the activities of the Transportation Corps in connection with the procurement, storage, and issue of the equipment and supplies for which the Transportation Corps was responsible. The Director of Military Training represented the Chief of Transportation in the planning and supervision of the training of officers, officer candidates, and enlisted men, and the preparation and publication of tables of organization and equipment, technical manuals, and mobilization training programs. The Director of Personnel, in addition to supervising the work of the Military Personnel Division and the Industrial Personnel Division, was responsible

for the development of policies and the control of personnel throughout the Transportation Corps.

In view of the rapid growth of the functions of the Transportation Corps and the progressive development of its organization and procedures, it was found advantageous to entrust to the Executive Officer a large measure of responsibility for screening matters which were to receive the personal attention of the Chief of Transportation, and for coordinating the handling of matters which were of interest to two or more directors.

Since so much had to be done in the way of developing organization and procedures, and improving operations which affected the entire Transportation Corps, it was considered desirable for the Chief of Transportation and his key personnel to meet from time to time with the commanders and key personnel of the ports of embarkation and the transportation zones, for the frank discussion of problems and proposed remedies. Sometimes the meetings with the port and zone personnel were held separately and sometimes jointly, depending upon the subjects under consideration. These meetings, although time-consuming, had a very beneficial effect in creating a unified point of view throughout the Transportation Corps and improving both administrative and operating methods.

CHART NO.16
OFFICE OF THE CHIEF OF TRANSPORTATION
1 JULY 1945



SECTION VIII

CONCLUSIONS

The war taught us many lessons in transportation, as in other fields. Some of them are expressly covered in the foregoing discussion and others are implied. A brief summary of principal conclusions, drawn from the experiences of officers who were associated with Army transportation before and after the establishment of the Transportation Corps, may be useful.

Primary among the points emphasized by the war is the need for a permanent Army Transportation Corps. The disadvantage of having a peacetime transportation organization which must be completely revamped to meet requirements during hostilities, has been demonstrated clearly twice within the last generation. The peacetime organization should be so set up as to furnish a proper foundation for whatever expansion may become necessary. In this way it would not only obviate a complete shuffling of functions and personnel when hostilities come, but it would develop a nucleus of personnel qualified by experience to take over the various key positions in the expanded structure.

The Chief of Transportation should have full responsibility for moving Army personnel and matériel in the zone of interior and to and from oversea commands, and for supplying the transportation equipment and training the transportation troop units required in theaters of operation. The principal deficiency in this respect during World War II lay in the fact that the Chief of Transportation did not control the movement of Army Air Forces freight by railway or highway in the zone of interior, or the movement of any Army personnel or freight by air in the zone of interior or to the oversea commands. He did not train the truck companies required to operate the motor transport services in theaters of operation, and did not have clear authority to prescribe the types of motor vehicles to be employed in those services.

The permanent organization of the Transportation Corps should include a strong planning staff. The recent war demonstrated the basic relationship of transportation to strategy, and that lesson must not be lost. Long-range transportation planning requires a broad knowledge of world conditions and an intimate acquaintance with transportation techniques. It must be done in close coordination with the operating elements of the transportation organization, as well as with the

elements of the War Department which deal with strategy and supply. Neither strategical nor procurement planning can be effective in global war unless the transportation planning is well done.

Research and development should be a continuing function of the permanent transportation organization. The progress of science is so rapid, and new inventions play so important a part in military success, that it would be nothing short of folly to fail to work for the improvement of our military transportation equipment with the same foresight that we surely will apply to aeronautics, ordnance, and other technical fields. Research and development should extend also to the organization and equipment of transportation troop units and to shipping procedures. The Transportation Corps Board, which began functioning early in 1945, has initiated such a program and should continue the work on the broadest practical basis.

Ports of embarkation, transportation zones, and all their subsidiary installations and activities should be under the direct control of the Chief of Transportation. Transportation on a world-wide scale requires complete coordination to avoid the inefficient use of equipment and the delay of movements. It is a highly technical service for which personnel must be technically trained and skillfully utilized. Personnel assigned to commanders of ports and to zone transportation officers by other services should be entirely under the control of those officers, in order that such personnel may be properly integrated with the general organization.

Supervision of the movement of supplies to oversea theaters should remain a function of the ports of embarkation. This plan has worked so satisfactorily during the past three years that it seems to offer little opportunity for differences of opinion. No other arrangement would afford as favorable conditions for coordinating the actions of the several technical services, and coordinating the inland and ocean carriers. The oversea supply divisions of the ports proved themselves fully capable of meeting theater requirements, both in keeping up the proper flow of maintenance supplies and complying with emergency requests for special shipments.

In addition to keeping the supervision of the movement of oversea supplies at the ports of embarkation, the idea should

be inculcated that theaters should rely to a greater extent upon current shipments of matériel from the zone of interior, and avoid the accumulation of unduly large stocks at oversea bases. The excessive quantities of supplies requested by the theaters during World War II often proved to be a burden, since they could not be properly stored and issued. The results were artificial shortages of certain supplies because of the large quantities tied up in the "pipeline," and a waste of shipping due to vessels being held in the theaters under load for excessive periods and unnecessarily large numbers of vessels being required to "roll up" supplies from rear to forward bases.

The zone transportation officers should have full authority to supervise the technical aspects of shipping activities at all Army installations in their respective territories, regardless of class. Only in this way can full compliance with sound practices and procedures be obtained, and an over-all program for the more effective utilization of transportation equipment be worked out. The zone transportation officer should have supervision also of the maintenance and operation of all utility railroad equipment assigned to Army installations, regardless of class.

When once a movement of troops to an oversea destination has been ordered, the execution and control of the movement should rest entirely with the Transportation Corps, unless, of course, a change in the movement order should become necessary. Higher echelons have not the time to study and understand the technical aspects of moving units and their organizational equipment to and through the ports, and therefore are not in a position to direct or give close supervision to such activities.

The training of Transportation Corps troop units should be entirely under the control of the Chief of Transportation. Such an arrangement would add materially to the expertness and continuity of the training, and would make possible the

concentration of training activities at fewer installations. Because of the close relationship in which various types of Transportation Corps units are required to work in the theaters, these units should be trained at the same installations and their training should include practice in cooperating with each other under conditions similar to those which are encountered overseas.

Transportation should be as fully integrated in the oversea commands as in the zone of interior. This implies a theater Chief of Transportation with staff responsibility for all types of transportation, and with theater-wide jurisdiction over operations so that movements between base sections can be fully coordinated. The proposal regarding theater transportation (FM 55-6), recently submitted by the Chief of Transportation, ASF, was carefully drafted after consultation with theater transportation officers. It represents the general thought on the subject, and should be approved.

The authority necessary to the exercise of full control over port-bound shipments in the event of war should be provided, and the machinery necessary to carry out such control should be planned in advance of the need. While the control which was established in World War II proved very effective, the delay in setting it up threatened embarrassing congestion at important ports during the early months of hostilities, and added to the problems arising from the sudden necessity of mobilizing for a two-ocean war.

Coordination between the Army and the Navy in all transportation matters was of great importance during the recent war and it probably would be of even greater importance in any future war. The effort to bring the policies and procedures of the two services into harmony, which already has made considerable progress, should be given further attention during the peace period when it will be possible to accomplish necessary adjustments within the services with less inconvenience than during wartime.

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